

Датчики контрастности и цвета

Технические характеристики

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Contrast sensors, color sensors





DK Series – Contrast sensors for secure detection of control marks

Contrast sensors are used mainly in automated packaging systems or print machines. The main requirement for the devices is the reliable detection of control marks. Device features such as high resolution of gray values (contrasts), short response times, resistance to variation in height and angle of the material path, and simple operation are all necessary. All of these requirements have been taken into account in the development of the DK series.

All the devices share in common a sturdy waterproof plastic housing, some having a replaceable lens and a front-side or right angle light outlet. The device is connected with an M12 metal connector. The short response time of 30 μ s is the same for all devices. A push-pull output stage is available as a signal output.

In the basic design, the device has only one optical transmission source and the switching threshold must be adjusted manually by means of a potentiometer. In another more user-friendly design, the device contains three optical transmission sources. A TEACH-IN process can be used to select the optimal transmission color for the existing contrast and to adjust the switching threshold automatically. Depending on the design of the device, the TEACH-IN is performed

either statically or dynamically.

For unusual applications in harsh and aggressive environments, the devices of the DKE series are constructed with stainless steel housings and also ideally suited for teach-in functions.

Type	Function	Sensing range	Page
DK10-LAS	Contrast sensor	300 mm/800 mm 12 m	346 348
DK10	Contrast sensor	9.5 mm	350
DK12	Contrast sensor	11 mm	352
DK20	Contrast sensor	9.5 mm/25 mm	354
DK21	Contrast sensor	9.5 mm/25 mm	358
DKE20 DKE21	Contrast sensor	9.5 mm	360
DK31	Contrast sensor	9.5 mm	362
DK34 DK35	Contrast sensor	9.5 mm	364
RL-UV3	Luminescence scanner	80 mm/130 mm	366
RL-UV4	Luminescence scanner	28 mm	368

Contrast sensors, color sensors



Color sensors

Confidently detecting and distinguishing between colors is playing a greater and greater role in all areas of industry. The applications involved are very diverse. Whether the need is to query a color marker at a fixed distance or to verify parts at varying distances, Pepperl+Fuchs can offer you a custom-designed solution for each of these cases.

Thanks to extended optical fiber line lengths, you can detect colors with no problems, even in explosion-hazardous environments. Even under conditions such as these, it is possible to achieve great detection ranges.

If multiple colors are involved, VISOLUX color sensors can save up to 10 colors, providing the functionality of ten single-channel devices.

The low response times of our devices allow for reliable online color identification even with fast processes.

Of course all devices are extremely simple to operate, since all colors to be evaluated can be saved in the sensor with TEACH-IN. Tolerances can be accurately taken into account by additional programming after initial TEACH-IN. Saved color values remain stored in the sensor even after the power supply has been turned off.

Type	Function	Sensing range	Page
DF12	Color sensor	11 mm	370
DF20	Color sensor, 1-channel	9.5 mm/25 mm	372
DFE20	Color sensor, 1-channel	9.5 mm	374
VCS110	Color sensor, multichannel	100 mm	376



Laser print mark contrast scanner

DK10-LAS/...



Features

- Laser print mark contrast sensor for recording very small print marks
 - Laser class 2, eyesafe
 - 30 µs response time, suitable for extremely rapid scanning processes
 - Sturdy, waterproof plastic housing
 - Large focus depth range from 3 mm ... 300 mm
- DK10-LAS/76a/110/124
 DK10-LAS/76a/79b/110/124
 DK10-LAS/9S50/76a/110/124
 DK10-LAS/9S20



For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.

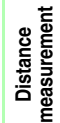
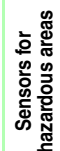
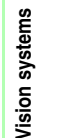
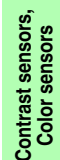
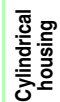
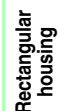
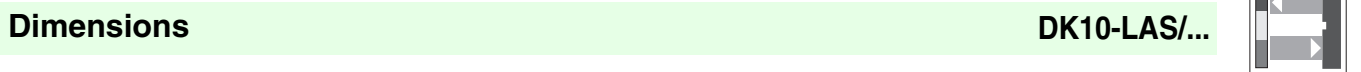
DK10-LAS/...

Technical data

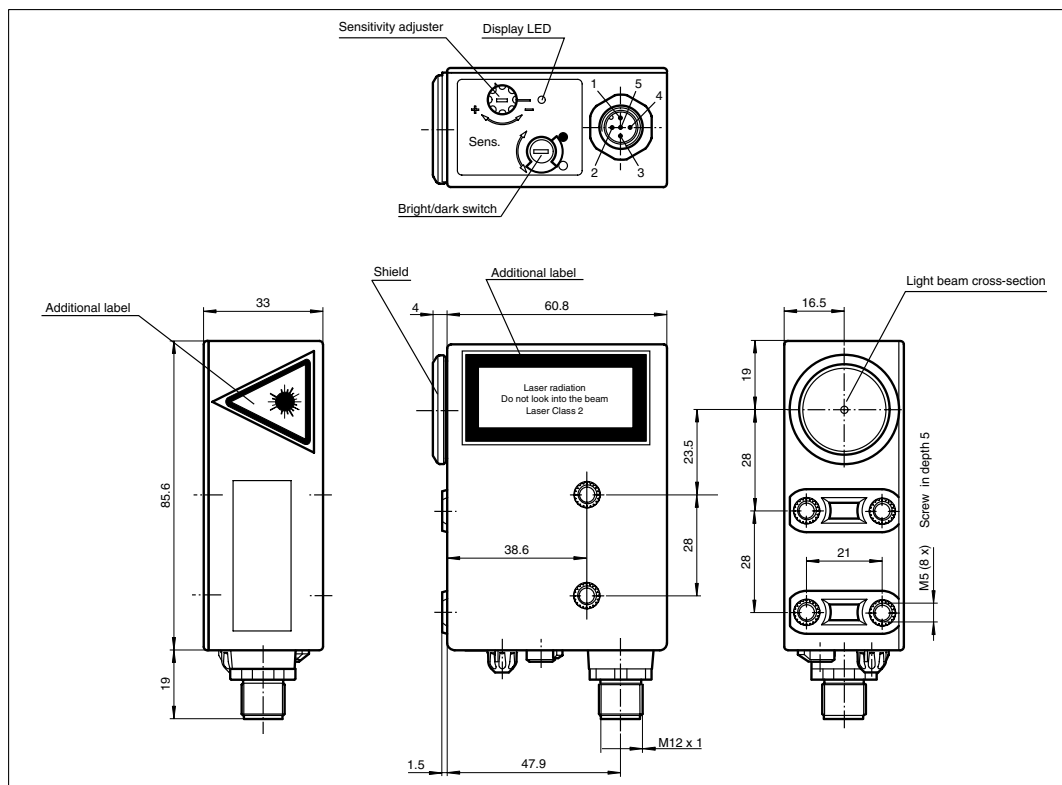
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		DK10-LAS/76a/110/124	DK10-LAS/76a/79b/110/124	DK10-LAS/9S/49	DK10-LAS/9S/79b	DK10-LAS/9S50/76a/110/124	DK10-LAS/9S20
Sensor range	300 mm	◆	◆			◆	◆
	800 mm			◆	◆		
Detection range	3 ... 300 mm	◆	◆			◆	◆
	3 ... 800 mm			◆	◆		
Light type	red, modulated light	◆	◆	◆	◆	◆	◆
Light source	laser diode , 650 nm	◆	◆	◆	◆	◆	◆
Laser class	2	◆	◆	◆	◆	◆	◆
Optical power output	< 1 mW	◆	◆	◆	◆	◆	◆
Beam divergence	≤ 1 mrad	◆	◆	◆	◆	◆	◆
Light spot representation	approx. 0.8 mm at a distance of 300 mm	◆	◆			◆	◆
	approx. 2 mm at a distance of 800 mm			◆	◆		
Transmitter frequency	approx. 140 kHz	◆	◆	◆	◆	◆	◆
Ambient light limit	40000 Lux	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
Function display	LED yellow: lights up if receiver is lit (light on), lights up if receiver is not lit (dark on)	◆	◆	◆	◆	◆	◆
Operating elements	light/dark switch, sensitivity adjuster	◆	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆	◆
No-load supply current	≤ 55 mA	◆	◆	◆	◆	◆	◆
Signal output	Push-pull output , short-circuit proof	◆	◆	◆	◆	◆	◆
	1 pnp and 1 npn short-circuit proof, open collector, synchronized-switching			◆			
Switching type	Light/dark ON, switchable	◆	◆	◆	◆	◆	◆
Switching voltage	max. 30 V DC			◆			
	PNP: U _B - 2.5 V / NPN: U _{Rest} 1.5 V	◆	◆		◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆	◆	◆
Switching frequency	16.5 kHz	◆	◆	◆	◆	◆	◆
Response time	30 µs	◆	◆	◆	◆	◆	◆
Timer function	Impulsed time element Off-delay 20 ms						◆
	Impulsed time element Off-delay 50 ms					◆	
Pulse length	approx. 2.5 µs	◆	◆	◆	◆	◆	◆
Measurement output	Analogue output 0.3 ... 10 mA, (RL ≤ 600 Ohm)		◆		◆		
Test input	emitter deactivation with +Ub	◆	◆	◆	◆	◆	◆
Standards	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Ambient temperature	-10 ... 50 °C (263 ... 323 K)	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... 75 °C (253 ... 348 K)	◆	◆	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆	◆	◆
Connection	connector M12 x 1, 5-pin	◆	◆	◆	◆	◆	◆
Material							
Housing	PC (Makrolon, glass-fibre-reinforced)	◆	◆	◆	◆	◆	◆
Optical face	glass	◆	◆	◆	◆	◆	◆
Mass	200 g	◆	◆	◆	◆	◆	◆

Dimensions DK10-LAS/...

Dimensions DK10-LAS/...

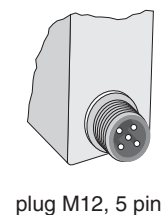
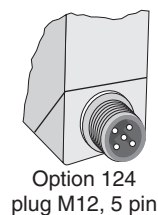
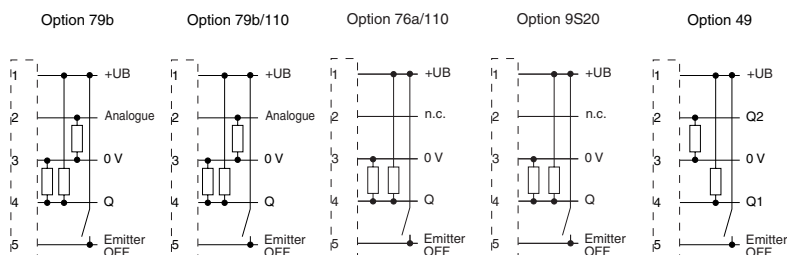


Dimensions

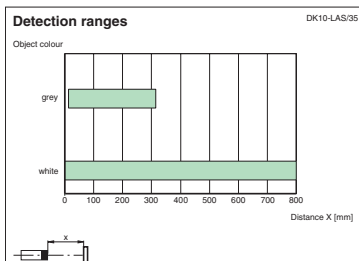
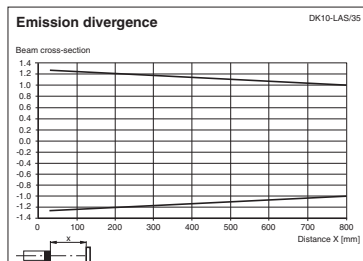
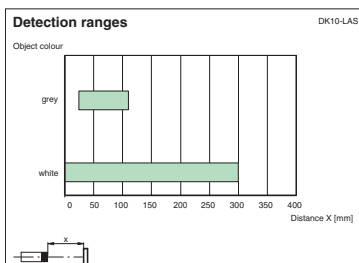
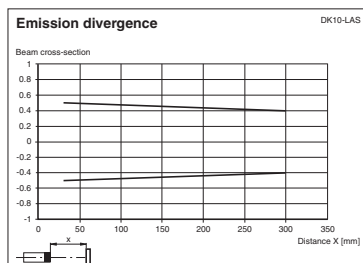


Electrical connection

Connection type



Diagrams



Date of issue: 09/11/2006

Subject to reasonable modifications due to technical advances.

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Miniature sensors
Rectangular housing
Cylindrical housing
Fibre optic devices
Fork type sensors
Contrast sensors, Color sensors
Vision systems
Sensors for hazardous areas
Light grids
Optical data coupler
Distance measurement
Accessories



Laser print mark contrast scanner

DK10-LAS-54/76/110/124



Features

- Laser class 2, eyesafe
- 30 µs response time, suitable for extremely rapid scanning processes
- Sturdy, waterproof plastic housing



For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.

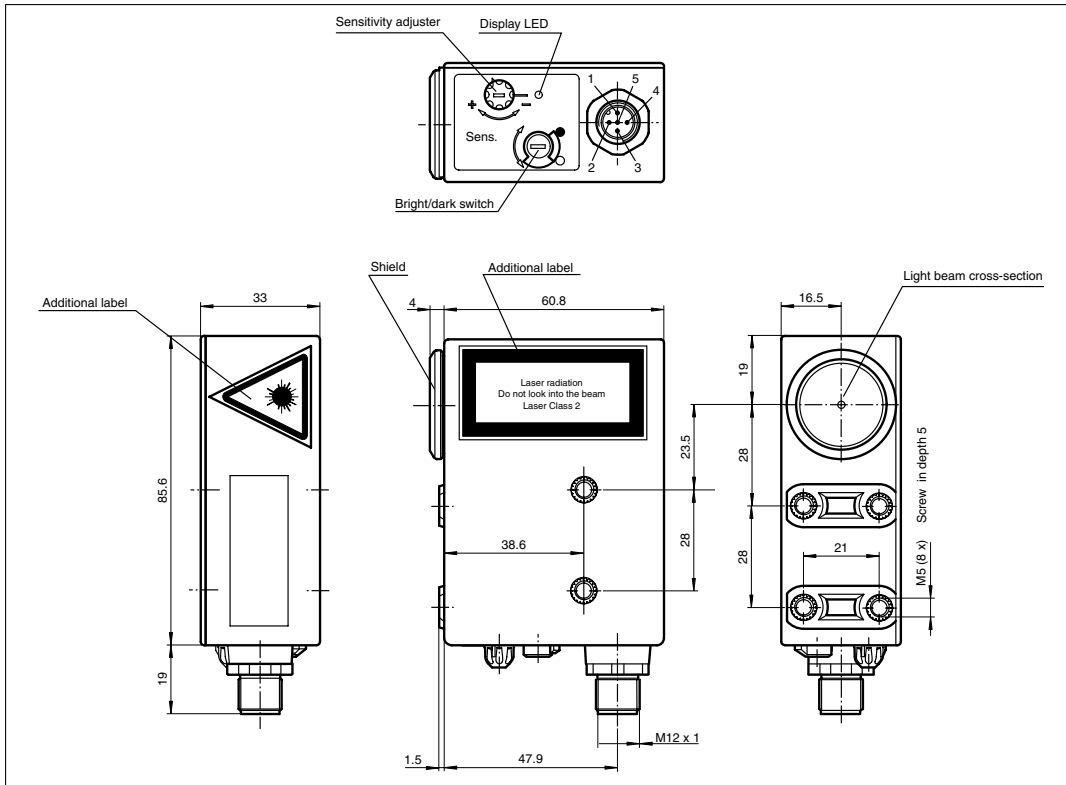
DK10-LAS-54/76/110/124

Technical data

Ordering code:

DK10-LAS-54/76/110/124

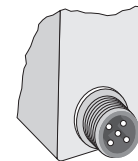
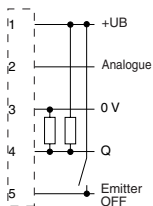
Effective detection range	0 ... 10 m	◆
Threshold detection range	12 m with reflector C110-2	◆
Reflector distance	0 ... 10 m	◆
Light type	red, modulated light	◆
Light source	laser diode , 650 nm	◆
Laser class	2	◆
Optical power output	< 1 mW	◆
Beam divergence	≤ 1 mrad	◆
Light spot representation	approx. 10 mm at a distance of 10 m	◆
Transmitter frequency	approx. 140 kHz	◆
Ambient light limit	40000 Lux	◆
Approvals	CE	◆
Function display	LED yellow: lights up if receiver is lit (light on), lights up if receiver is not lit (dark on)	◆
Operating elements	light/dark switch, sensitivity adjuster	◆
Operating voltage	10 ... 30 V DC	◆
Ripple	10 %	◆
No-load supply current	≤ 55 mA	◆
Signal output	Push-pull output , short-circuit proof	◆
Switching type	Light/dark ON, switchable	◆
Switching voltage	PNP: U _B - 2.5 V / NPN: U _{Rest} 1.5 V	◆
Switching current	max. 200 mA	◆
Switching frequency	16.5 kHz	◆
Response time	30 µs	◆
Pulse length	approx. 2.5 µs	◆
Test input	emitter deactivation with +Ub	◆
Standards	EN 60947-5-2	◆
Ambient temperature	-10 ... 50 °C (263 ... 323 K)	◆
Storage temperature	-20 ... 75 °C (253 ... 348 K)	◆
Protection degree	IP67	◆
Connection	connector M12 x 1, 5-pin	◆
Material		◆
Housing	PC (Makrolon, glass-fibre-reinforced)	◆
Optical face	glass	◆
Mass	200 g	◆



Electrical connection

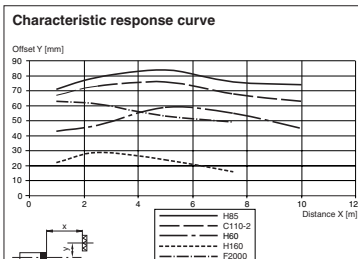
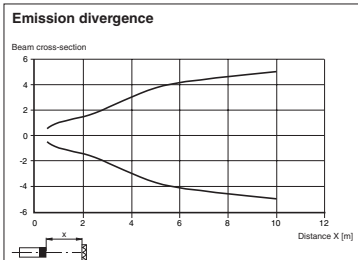
Connection type

Option 76/110

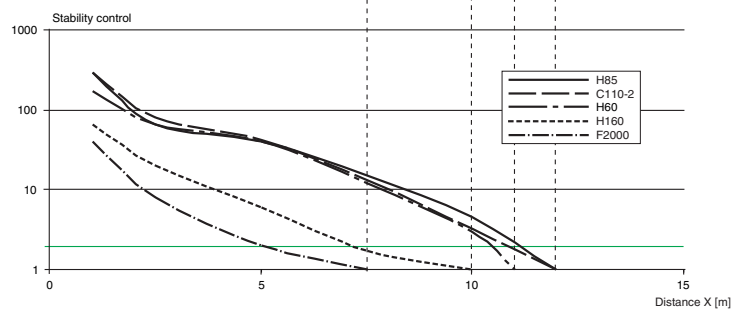
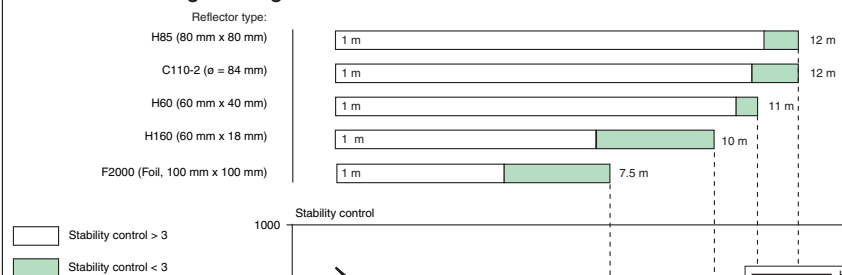


plug M12, 5 pin

Diagrams

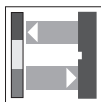


Relative received light strength



Subject to reasonable modifications due to technical advances.

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Print mark contrast scanner

DK10-9,5/.../92/110



Features

- Optical system exchangeable by 90°
- Push-pull output
- 30 µs response time, suitable for extremely rapid scanning processes
- sturdy plastic housing
- Protection degree IP67

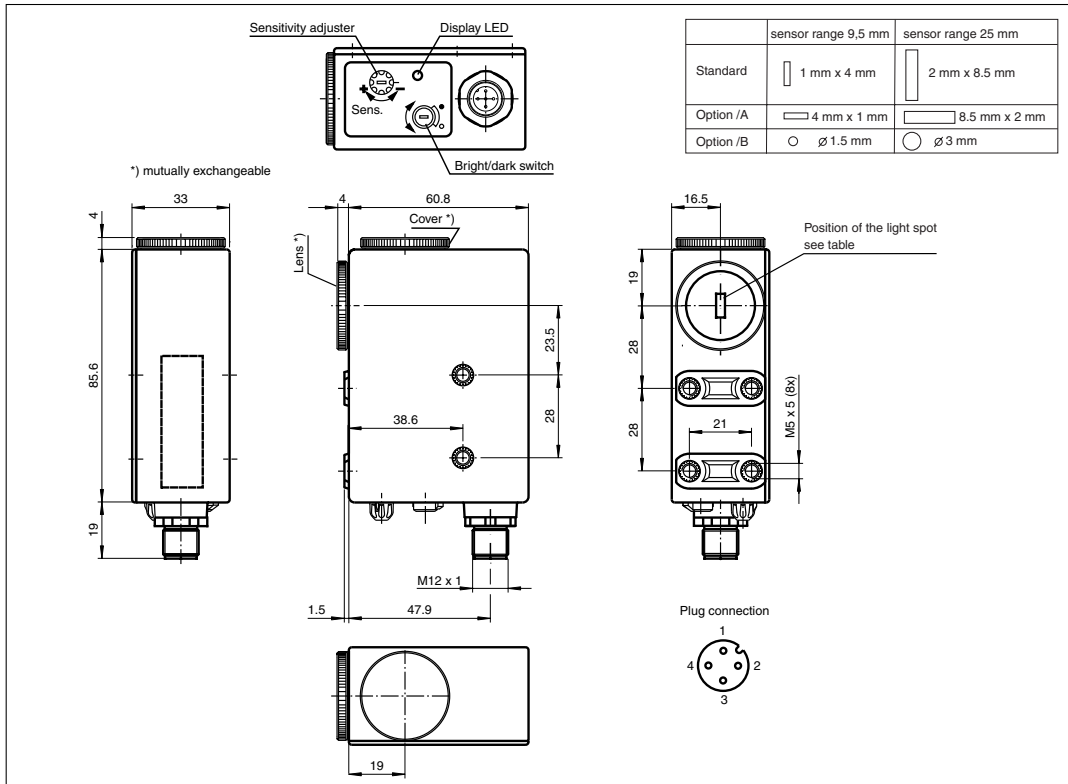


For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.

DK10-9,5/.../92/110

Technical data

		Ordering code:				
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Contrast sensors, Color sensors	Sensor range	9.5 mm +/-3 mm	◆	◆	◆	◆
	Light type	green, modulated light	◆	◆	◆	◆
	Light source	LED	◆	◆	◆	◆
	Light spot representation	1 mm x 4 mm , light spot along to longitudinal direction	◆	◆	◆	◆
		1 mm x 4 mm , light spot crossways to longitudinal direction			◆	◆
Vision systems	Angle deviation	max. ± 3°	◆	◆	◆	◆
	Approvals	CE	◆	◆	◆	◆
	Function display	LED yellow: lights up if receiver is lit (light on), lights up if receiver is not lit (dark on)	◆	◆	◆	◆
	Operating elements	Sensitivity adjuster, light/dark switch	◆	◆	◆	◆
	Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
	Ripple	10 %	◆	◆	◆	◆
	No-load supply current	≤ 55 mA	◆	◆	◆	◆
	Signal output	Push-pull output, short-circuit proof, protected against reverse polarity	◆	◆	◆	◆
	Switching type	light/dark ON, switchable	◆	◆	◆	◆
	Switching voltage	PNP: ≥ (+U _B -2.5 V) , NPN: ≤ 1.5 V	◆	◆	◆	◆
Sensors for hazardous areas	Switching current	max. 200 mA	◆	◆	◆	◆
	Switching frequency	16.5 kHz	◆	◆	◆	◆
	Response time	30 µs	◆	◆	◆	◆
	Timer function	Impulsed time element off-delay 20 ms		◆		
	Measurement output	Analogue output 0.3 ... 10 mA, (RL ≤ 600 Ohm)	◆		◆	
Light grids	Standards	EN 60947-5-2	◆	◆	◆	◆
	Ambient temperature	-20 ... 60 °C (253 ... 333 K)	◆	◆	◆	◆
	Storage temperature	-20 ... 75 °C (253 ... 348 K)	◆	◆	◆	◆
	Protection degree	IP67	◆	◆	◆	◆
	Connection	M12 connector, 4-pin	◆	◆	◆	◆
	Material					
	Housing	PC (Makrolon, glass-fibre-reinforced)	◆	◆	◆	◆
	Optical face	glass	◆	◆	◆	◆
Optical data coupler	Mass	200 g	◆	◆	◆	◆

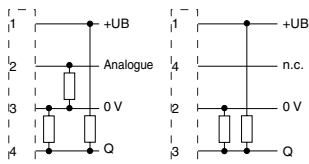


Electrical connection

Connection type

Option 79b/110

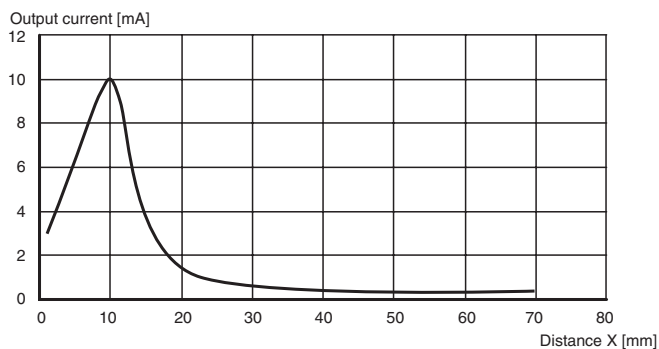
Option 92/110



Diagrams

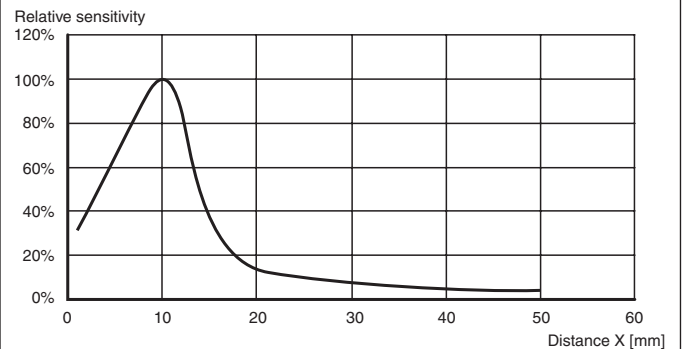
Analogue output

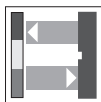
DK10-9,5



Relative received light strength

DK10-9,5





Print mark contrast scanner

DK12-11/.../124/136



Features

- Diffuse mode sensor for recording any print mark
- TEACH-IN, static and dynamic
- 50 μ s response time, suitable for extremely rapid scanning processes
- 3 emitter colours: green, red and blue

For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.

DK12-11/.../124/136

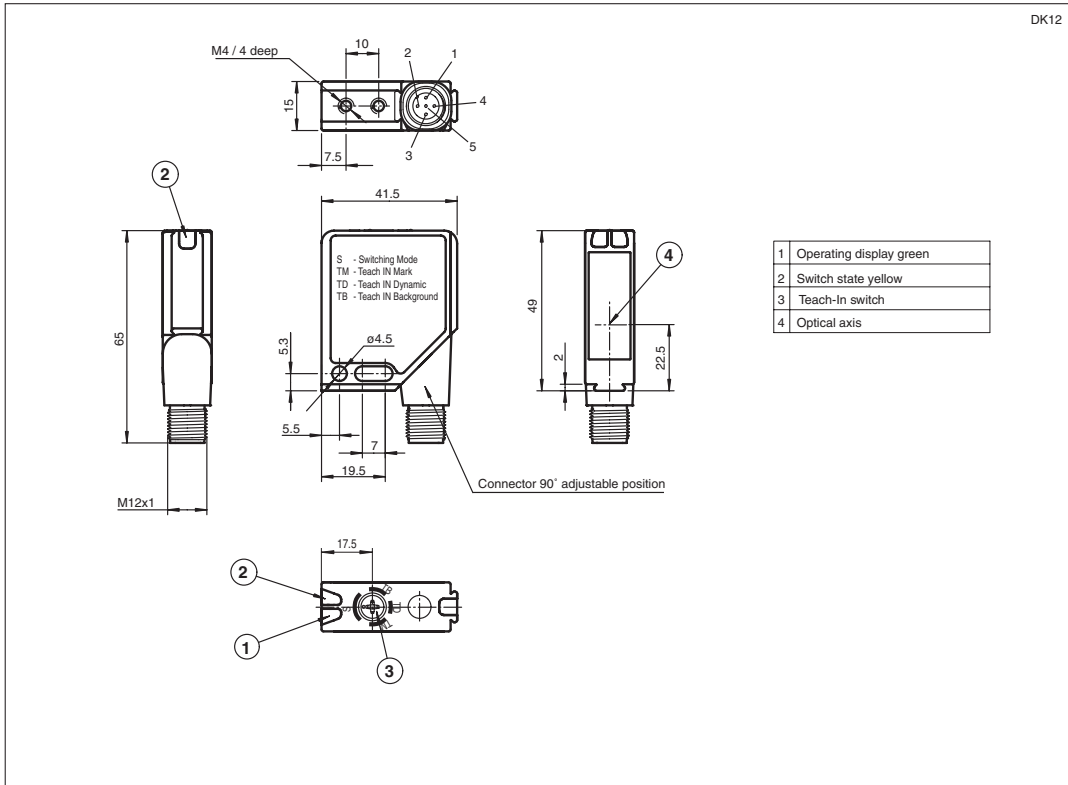
Technical data

Ordering code:

DK12-11/124/136

DK12-11/124/136

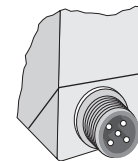
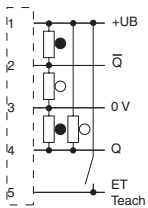
Contrast sensors, Color sensors			DK12-11/124/136	DK12-11/124/136
Sensor range	11 mm $\pm$ 2 mm		◆	◆
Light type	Visible green/red/blue, modulated light		◆	◆
Light source	3 LEDs (R,G,B)		◆	◆
Light spot representation	1 mm x 3 mm		◆	◆
Angle deviation	max. $\pm$ 3°		◆	◆
TEACH-IN	static and dynamic TEACH-IN		◆	◆
Approvals	CE, cULus		◆	◆
Operating display	Green LED, statically lit Power on , short-circuit : LED green flashing (approx. 4 Hz)		◆	◆
	Green LED, statically lit Power on , Undervoltage indicator: Green LED, pulsing (approx. 0.8 Hz) , short-circuit : LED green flashing (approx. 4 Hz)			◆
Function display	2 LEDs yellow, light up in case of detection		◆	◆
Operating elements	TEACH-IN rotary switch for Switching operation, Teach-In mark, Teach-In background and dynamic Teach-In		◆	◆
TEACH-IN indication	TEACH-IN mark: LED green/yellow equiphase flashing; 2,5 Hz . TEACH-IN background: LED green/yellow non equiphase flashing; 2,5 Hz . TEACH-IN dynamic: LED green/yellow equiphase flashing; 1.0 Hz . Teach Error:LED green/yellow non equiphase flashing; 8.0 Hz .		◆	◆
Sensors for hazardous areas			DK12-11/124/136	DK12-11/124/136
Operating voltage	10 ... 30 V DC		◆	◆
Ripple	10 %		◆	◆
No-load supply current	$\leq$ 80 mA		◆	◆
Protection class	II, rated voltage $\leq$ 250 V AC with degree of pollution 1-2 according to IEC 60664-1		◆	◆
Signal output	2 Push-pull outputs, complementary, short-circuit proof, reverse polarity-protected		◆	◆
Switching type	light/dark switching		◆	◆
Switching voltage	max. 30 V DC		◆	◆
Switching current	max. 100 mA		◆	◆
Switching frequency	10 kHz		◆	◆
Response time	50 μ s		◆	◆
Timer function	Impulsed time element off-delay 20 ms			◆
Function input	Ext. Teach-In input (ET)		◆	◆
Standards	EN 60947-5-2		◆	◆
Ambient temperature	-20 ... 60 °C (253 ... 333 K)		◆	◆
Storage temperature	-40 ... 75 °C (233 ... 348 K)		◆	◆
Protection degree	IP67		◆	◆
Connection	Metal connector M12, 5-pin, 90° convertible		◆	◆
Material				
Housing	Frame: die-cast zinc, nickel-plated Laterals: plastic PC, glass-fiber reinforced		◆	◆
Optical face	Plastic pane		◆	◆
Mass	60 g		◆	◆



Electrical connection

Connection type

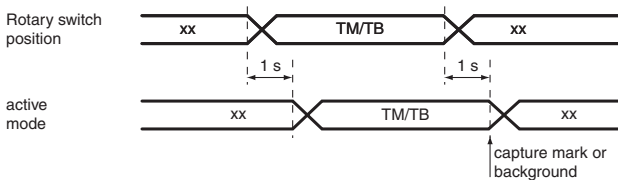
Option 124/136



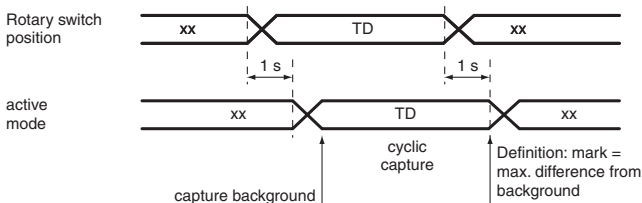
Option 124
plug M12, 5 pin

Diagrams

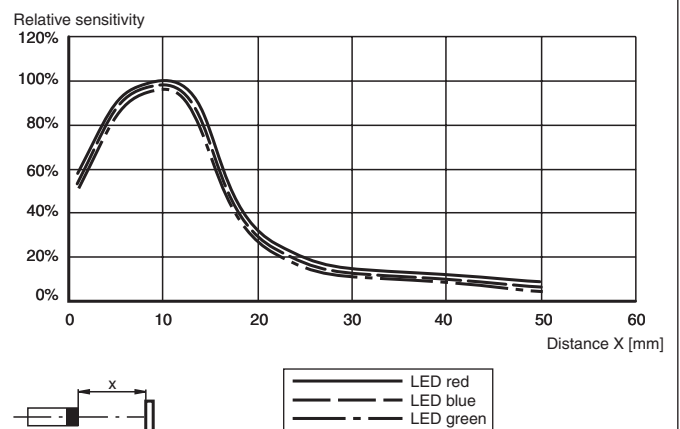
Static TEACH-IN

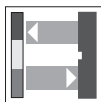


Dynamic TEACH-IN



Relative received light strength





Print mark contrast scanner

DK20-.../.../110/124



Features

- **Static TEACH-IN:** automatic switching threshold adaptation
- **30 µs response time**, suitable for extremely rapid scanning processes
- **3 emitter colours:** green, red and blue
- **Powerful push-pull output**
- **Optical system exchangeable by 90°**
- **Sturdy, waterproof plastic housing**

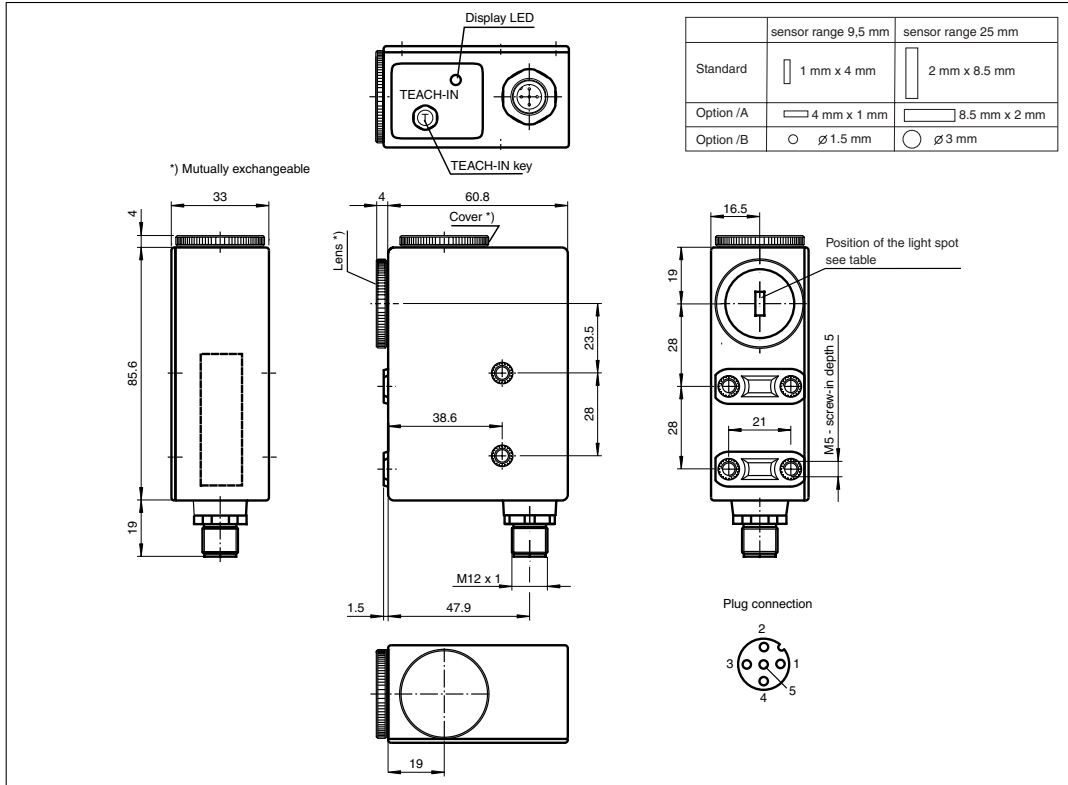
For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.

DK20-.../.../110/124

Technical data

Ordering code:

Sensor range	25 mm +/- 6 mm 9.5 mm +/- 3 mm										
		DK20-25/110/124	DK20-25/A/110/124	DK20-25/B/110/124	DK20-9.5/110/124	DK20-9.5/79B/110/124	DK20-9.5/9S20/110/124	DK20-9.5/A/110/124	DK20-9.5/A/79B/110/124	DK20-9.5/B/110/124	DK20-9.5/B/79B/110/124
Light type	Visible green/red/blue, modulated light	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Light spot representation	Light spot, point-shaped, diameter 1.5 mm										
	Light spot, point-shaped, diameter 3 mm				◆						◆
Vision systems	1 mm x 4 mm					◆	◆	◆			
	1 mm x 4 mm , light spot crossways to longitudinal direction								◆	◆	
	2 mm x 8.5 mm	◆									
	2 mm x 8.5 mm , light spot crossways to longitudinal direction		◆								
Angle deviation	max. ± 3°	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
TEACH-IN	static TEACH-IN	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Sensors for hazardous areas	Function display										
	LED yellow; switching operation: lights up if print mark is detected										
	TEACH-IN operation: flashing slowly	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	alarm display: flashing quickly, if no safe operation is possible										
Operating elements	TEACH-IN key	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
No-load supply current	≤ 70 mA	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Signal output	Push-pull output, short-circuit proof, protected against reverse polarity	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Switching type	light/dark ON switchable, results from the order of the TEACH-IN	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Switching voltage	PNP: ≥ (+U _B -2.5 V) , NPN: ≤ 1.5 V	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Switching frequency	16.5 kHz	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Response time	30 µs	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Timer function	Impulsed time element off-delay 20 ms						◆				
Measurement output	Analogue output 0.3 ... 10 mA, (RL ≤ 600 Ohm)						◆			◆	◆
Function input	TEACH-IN input	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Standards	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Ambient temperature	-20 ... 60 °C (253 ... 333 K)	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... 75 °C (253 ... 348 K)	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Connection	M12 connector, 5 pin	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Material											
Housing	PC (Makrolon, glass-fibre-reinforced)	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Optical face	glass	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Mass	200 g	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆



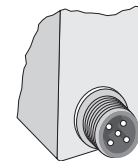
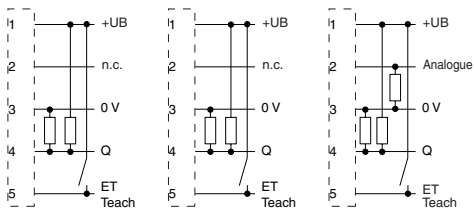
Electrical connection

Connection type

Option 110

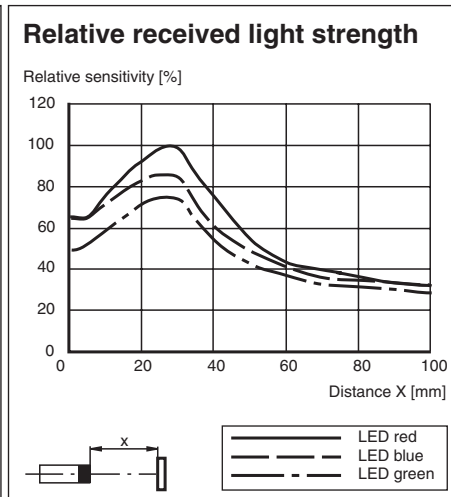
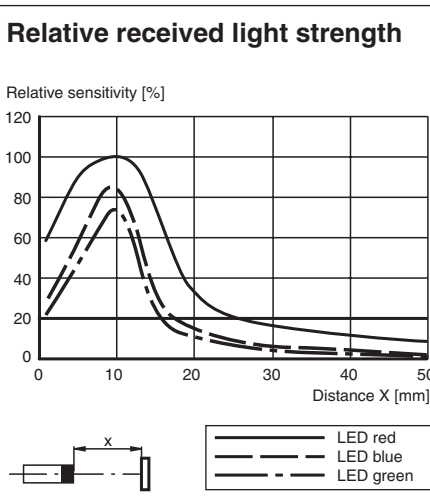
Option 9S20/110

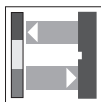
Option 79b/110



plug M12, 5 pin

Diagrams





Print mark contrast scanner

DK20/...20



Features

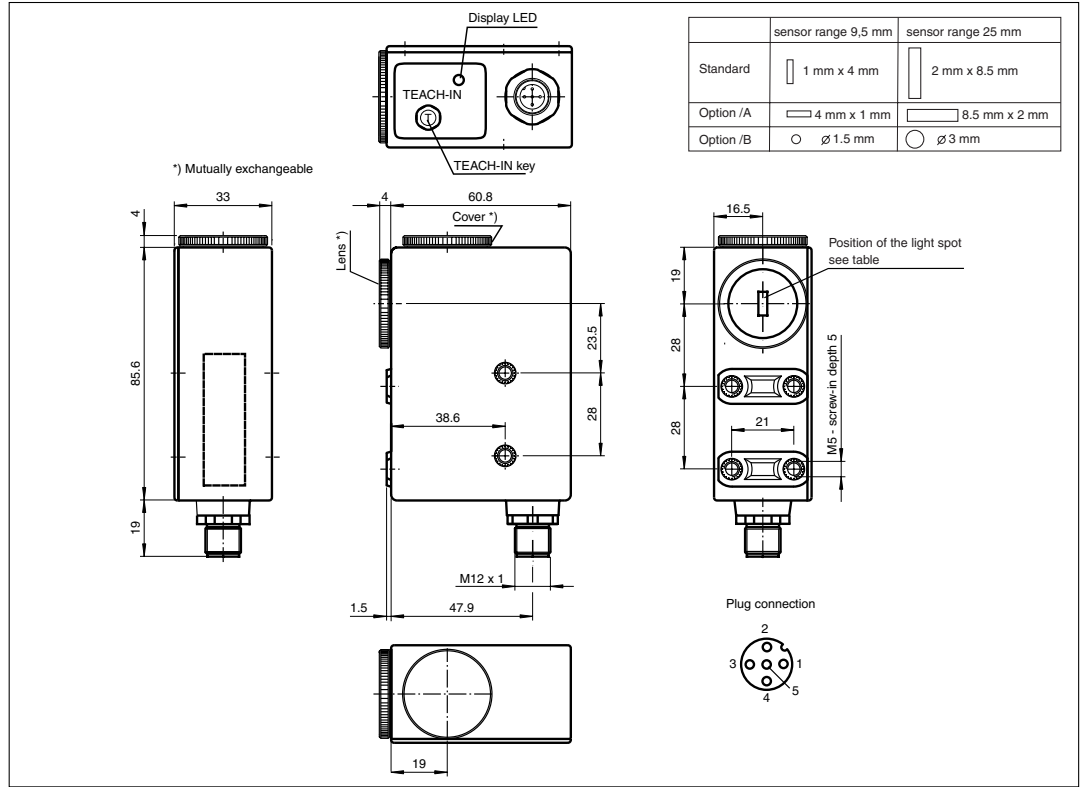
- **Static TEACH-IN:** automatic switching threshold adaptation
- **30 µs response time**, suitable for extremely rapid scanning processes
- **Powerful push-pull output**
- **Optical system exchangeable by 90°**
- **Sturdy, waterproof plastic housing**

For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.

DK20/...20

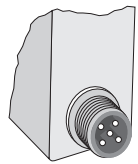
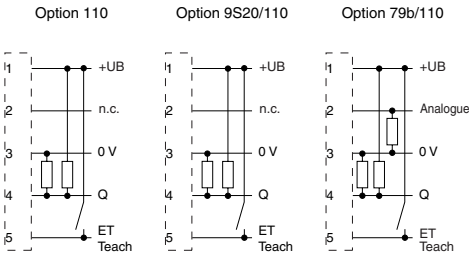
Technical data

Ordering code:		DK20/A35B	DK20/35A/9S20	DK20/35B	DK20/35B/79B
Sensor range	25 mm +/- 6 mm		◆		
	50 mm	◆		◆	◆
Light type	red, modulated light	◆		◆	◆
	Visible green/red/blue, modulated light		◆		
Light source	LED	◆	◆	◆	◆
Light spot representation	2 mm x 8.5 mm , light spot along to longitudinal direction		◆		
	3 mm x 16 mm , light spot along to longitudinal direction			◆	◆
	3 mm x 16 mm , light spot crossways to longitudinal direction	◆			
Angle deviation	max. ± 3°	◆	◆	◆	◆
TEACH-IN	static TEACH-IN	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
Function display	LED yellow; switching operation: lights up if print mark is detected		◆	◆	◆
	TEACH-IN operation: flashing slowly	◆	◆	◆	◆
	alarm display: flashing quickly, if no safe operation is possible				
Operating elements	TEACH-IN key	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	≤ 70 mA	◆	◆	◆	◆
Signal output	Push-pull output, short-circuit proof, protected against reverse polarity	◆	◆	◆	◆
Switching type	light/dark ON switchable, results from the order of the TEACH-IN	◆	◆	◆	◆
Switching voltage	PNP: ≥ (+U _B -2.5 V) , NPN: ≤ 1.5 V	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆
Switching frequency	16.5 kHz	◆	◆	◆	◆
Response time	30 µs	◆	◆	◆	◆
Timer function	Impulsed time element off-delay 20 ms		◆		
Measurement output	Analogue output 0.3 ... 10 mA, (R _L ≤ 600 Ohm)				◆
Function input	TEACH-IN input	◆	◆	◆	◆
Standards	EN 60947-5-2	◆	◆	◆	◆
Ambient temperature	-20 ... 60 °C (253 ... 333 K)	◆	◆	◆	◆
Storage temperature	-20 ... 75 °C (253 ... 348 K)	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆
Connection	M12 connector, 5 pin	◆	◆	◆	◆
Material					
Housing	PC (Makrolon, glass-fibre-reinforced)	◆	◆	◆	◆
Optical face	glass	◆	◆	◆	◆
Mass	200 g	◆	◆	◆	◆



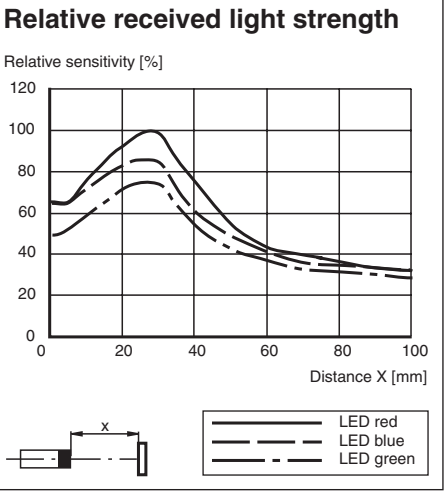
Electrical connection

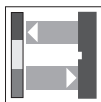
Connection type



plug M12, 5 pin

Diagrams





Print mark contrast scanner

DK.21-.../110/124



Features

- **Dynamic TEACH-IN:** automatic switching threshold adaptation with one key pressure
- **30 µs response time**, suitable for extremely rapid scanning processes
- **3 emitter colours:** green, red and blue
- **Powerful push-pull output**
- **Optical system exchangeable by 90°**
- **Sturdy, waterproof plastic housing**
- **Stainless steel version**, especially suitable for applications in the food industry
DKE21-9,5/110/124

For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.

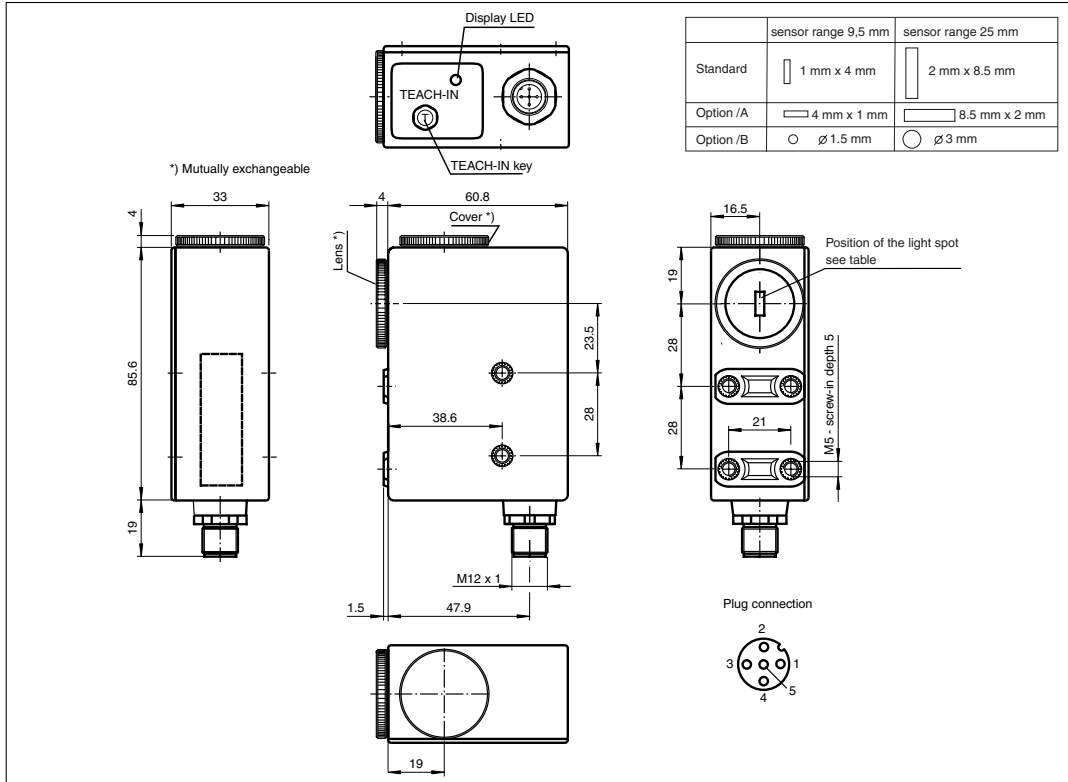
DK.21-.../110/124

Technical data

Ordering code:

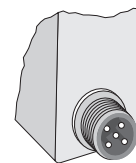
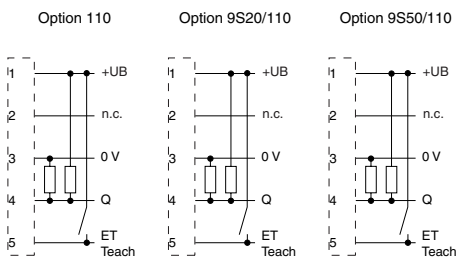
	DK21-25/110/124	DK21-25/B/110/124	DK21-9,5/110/124	DK21-9,5/9S20/110/124	DK21-9,5/9S50/110/124	DK21-9,5/A/110/124	DKE21-9,5/110/124
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Contrast sensors, Color sensors	Sensor range	25 mm +/- 6 mm	◆	◆			
		9.5 mm +/-3 mm			◆	◆	◆
	Light type	Visible green/red/blue, modulated light	◆	◆	◆	◆	◆
	Light source	LED	◆	◆	◆	◆	◆
Vision systems	Light spot representation	Light spot, point-shaped, diameter 3 mm		◆			
		rectangular 1 mm x 4 mm			◆	◆	◆
		1 mm x 4 mm , light spot crossways to longitudinal direction					◆
		2 mm x 8.5 mm	◆				
Sensors for hazardous areas	Angle deviation	max. ± 3°	◆	◆	◆	◆	◆
	TEACH-IN	Dynamic TEACH-IN	◆	◆	◆	◆	◆
	Approvals	CE	◆	◆	◆	◆	◆
	Function display	LED yellow; switching operation: lights up if print mark is detected alarm display: flashing quickly, if no safe operation is possible	◆	◆	◆	◆	◆
Light grids	Operating elements	TEACH-IN key	◆	◆	◆	◆	◆
	Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆
	Ripple	10 %	◆	◆	◆	◆	◆
	No-load supply current	≤ 60 mA	◆	◆	◆	◆	◆
Optical data coupler	Signal output	Push-pull output, short-circuit proof, protected against reverse polarity	◆	◆	◆	◆	◆
	Switching voltage	PNP: ≥ (+U _B -2.5 V) , NPN: ≤ 1.5 V	◆	◆	◆	◆	◆
	Switching current	max. 200 mA	◆	◆	◆	◆	◆
	Switching frequency	16.5 kHz	◆	◆	◆	◆	◆
Distance measurement	Response time	30 µs	◆	◆	◆	◆	◆
	Timer function	Impulsed time element off-delay 20 ms			◆		
		Impulsed time element Off-delay 50 ms				◆	
	Function input	TEACH-IN input	◆	◆	◆	◆	◆
Accessories	Standards	EN 60947-5-2	◆	◆	◆	◆	◆
	Ambient temperature	-20 ... 60 °C (253 ... 333 K)	◆	◆	◆	◆	◆
	Storage temperature	-20 ... 75 °C (253 ... 348 K)	◆	◆	◆	◆	◆
	Protection degree	IP67	◆	◆	◆	◆	◆
Distance measurement	Connection	M12 connector, 5 pin	◆	◆	◆	◆	◆
	Material						
	Housing	Stainless steel					◆
		PC (Makrolon, glass-fibre-reinforced)	◆	◆	◆	◆	◆
Accessories	Optical face	glass	◆	◆	◆	◆	◆
	Mass	200 g	◆	◆	◆	◆	◆
		530 g					◆



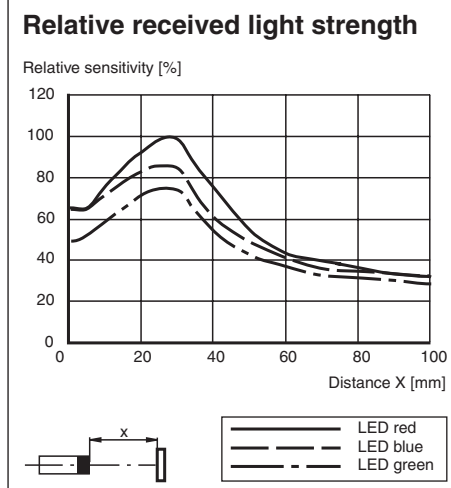
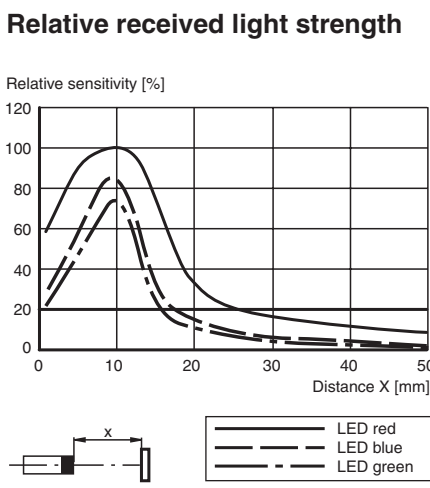
Electrical connection

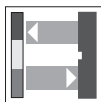
Connection type



plug M12, 5 pin

Diagrams





Print mark contrast scanner

DKE20-9,5/.../110/124



Features

- **Static TEACH-IN:** automatic switching threshold adaptation
- **30 µs response time**, suitable for extremely rapid scanning processes
- **3 emitter colours:** green, red and blue
- **Powerful push-pull output**
- **Optical system exchangeable by 90°**
- **Stainless steel version**, especially suitable for applications in the food industry

For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.

DKE20-9,5/.../110/124

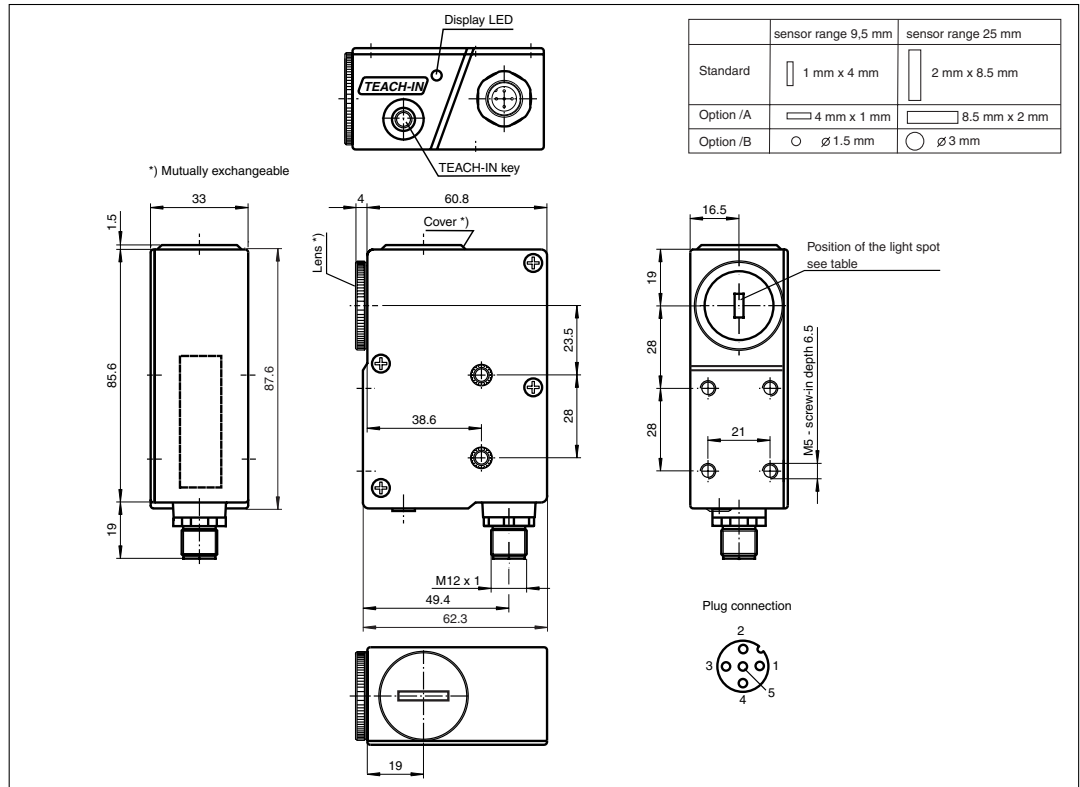
Technical data

Ordering code:

Sensor range, Color sensors		DKE20-9,5/110/124	
		DKE20-9,5/110/124	DKE20-9,5/9s20/110/124
Sensor range	9.5 mm +/-3 mm	◆	◆
Light type	Visible green/red/blue, modulated light	◆	◆
Light source	LED	◆	◆
Light spot representation	rectangular 1 mm x 4 mm	◆	◆
Angle deviation	max. ± 3°	◆	◆
TEACH-IN	static TEACH-IN	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow; switching operation: lights up if print mark is detected TEACH-IN operation: flashing slowly alarm display: flashing quickly, if no safe operation is possible	◆	◆
Operating elements	TEACH-IN key	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 70 mA	◆	◆
Signal output	Push-pull output, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	light/dark ON switchable, results from the order of the TEACH-IN	◆	◆
Switching voltage	PNP: ≥ (+U _B -2.5 V) , NPN: ≤ 1.5 V	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	16.5 kHz	◆	◆
Response time	30 µs	◆	◆
Timer function	Impulsed time element off-delay 20 ms	◆	◆
Function input	TEACH-IN input	◆	◆
Standards	EN 60947-5-2	◆	◆
Ambient temperature	-20 ... 60 °C (253 ... 333 K)	◆	◆
Storage temperature	-20 ... 75 °C (253 ... 348 K)	◆	◆
Protection degree	IP67	◆	◆
Connection	Metal connector M12 x 1, 5-pin	◆	◆
Material			
Housing	Stainless steel	◆	◆
Optical face	glass	◆	◆
Mass	530 g	◆	◆

Dimensions

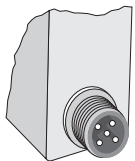
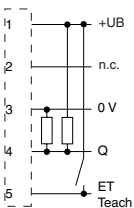
DKE20-9,5/.../110/124



Electrical connection

Connection type

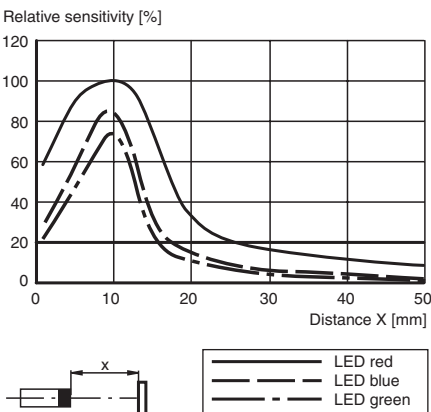
Option 110



plug M12, 5 pin

Diagrams

Relative received light strength



Miniature sensors
Rectangular housing
Cylindrical housing
Fibre optic devices
Fork type sensors
Contrast sensors, Color sensors
Vision systems
Sensors for hazardous areas
Light grids
Optical data coupler
Distance measurement
Accessories



Print mark contrast scanner

DK31-9,5/110/124



Features

- 30 µs response time, suitable for extremely rapid scanning processes
- TEACH-IN procedure for automatic threshold value setting
- 3 emitter colours: green, red and blue
- Powerful push-pull output
- High accuracy for precise positioning operations
- Sturdy, waterproof plastic housing

For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.

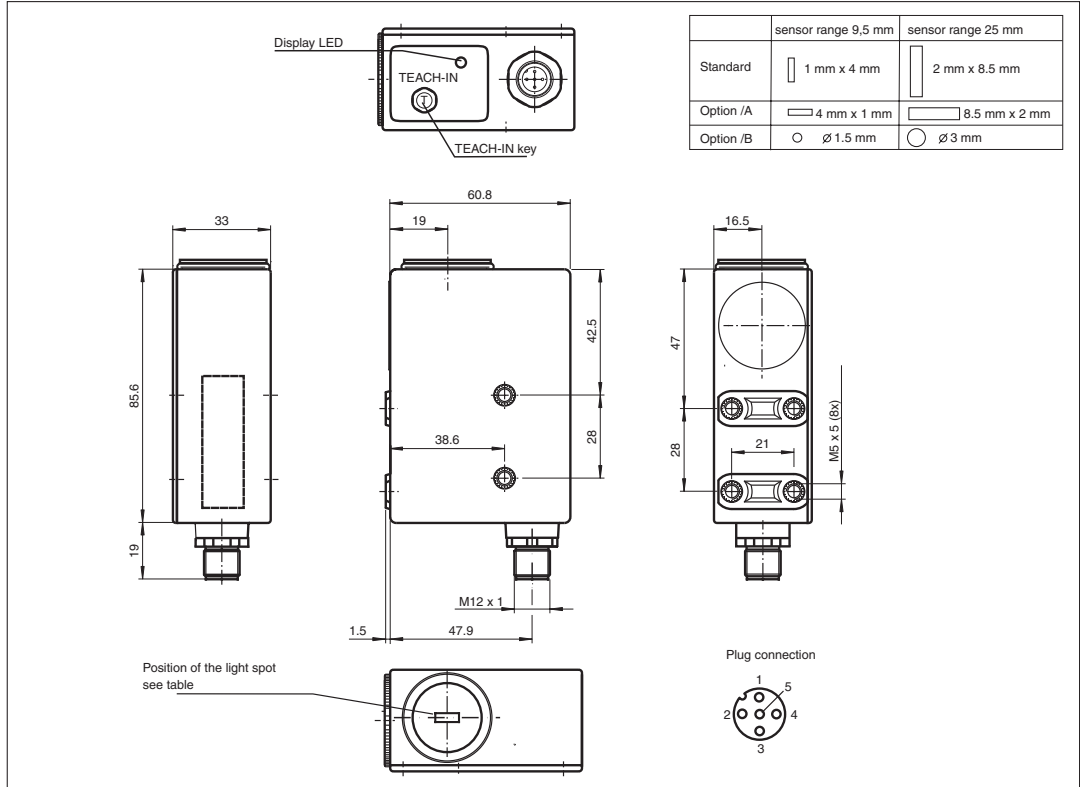
DK31-9,5/110/124

Technical data

Ordering code:

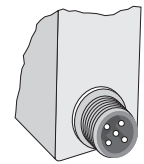
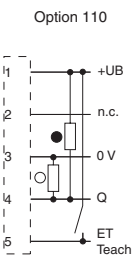
DK31-9,5/110/124

Sensor range	9.5 mm ± 3 mm	◆
Light type	Visible green/red/blue, modulated light	◆
Light source	3 LEDs (R,G,B)	◆
Light spot representation	rectangular 1 mm x 4 mm	◆
Angle deviation	max. ± 3°	◆
Jitter	≤ 20 µs	◆
TEACH-IN	Dynamic TEACH-IN	◆
Ambient light limit	5000 Lux	◆
Approvals	CE	◆
Function display	LED yellow; switching operation: lights up if print mark is detected TEACH-IN operation: flashing slowly alarm display: flashing quickly, if no safe operation is possible	◆
Operating elements	TEACH-IN key	◆
Operating voltage	10 ... 30 V DC	◆
Ripple	10 %	◆
No-load supply current	≤ 75 mA	◆
Signal output	Push-pull output, short-circuit proof, protected against reverse polarity	◆
Switching type	Output switches to U _B when print mark is detected and to 0 V when background is detected	◆
Switching voltage	PNP: ≥ (+U _B -2.5 V) , NPN: ≤ 1.5 V	◆
Switching current	max. 200 mA	◆
Switching frequency	16.5 kHz	◆
Response time	30 µs	◆
Function input	TEACH-IN input	◆
Standards	EN 60947-5-2	◆
Ambient temperature	-20 ... 60 °C (253 ... 333 K)	◆
Storage temperature	-20 ... 75 °C (253 ... 348 K)	◆
Protection degree	IP67	◆
Connection	M12 connector, 5 pin	◆
Material		◆
Housing	PC (Makrolon, glass-fibre-reinforced)	◆
Optical face	glass	◆
Mass	200 g	◆



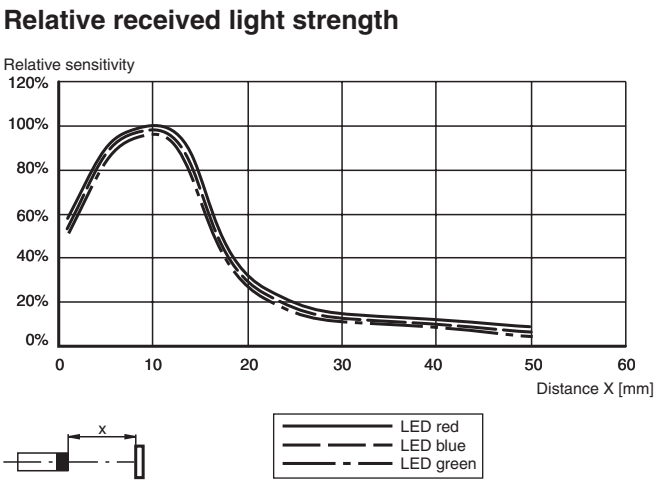
Electrical connection

Connection type



plug M12, 5 pin

Diagrams





Print mark contrast scanner

-9,5/110/124



Features

- 30 µs response time, suitable for extremely rapid scanning processes
- TEACH-IN procedure for automatic threshold value setting
- 3 emitter colours: green, red and blue
- Powerful push-pull output
- High accuracy for precise positioning operations
- Sturdy, waterproof plastic housing

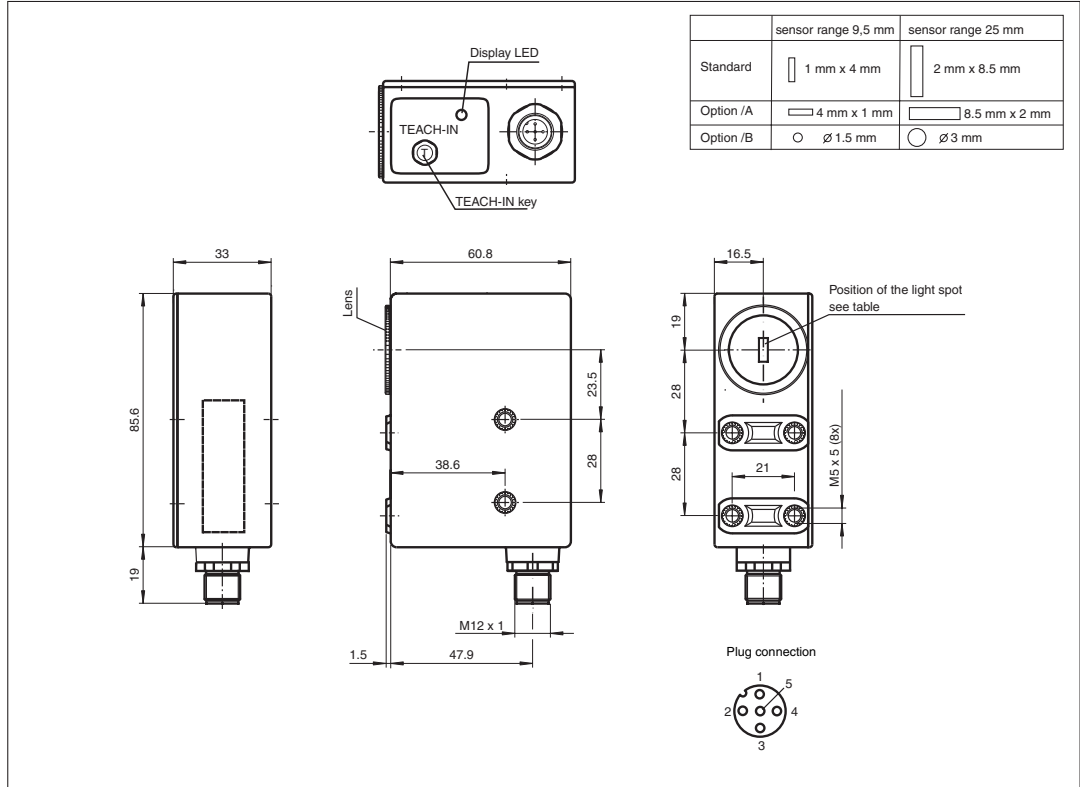


For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.

-9,5/110/124

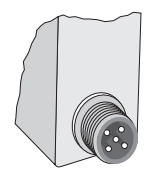
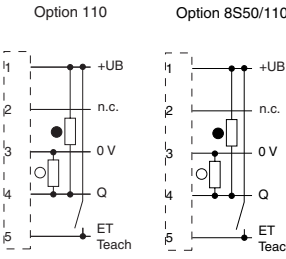
Technical data

		Ordering code:		
		DK34-9,5/110/124	DK34-9,5/6S50/110/124	DK35-9,5/110/124
Contrast sensors, Color sensors	Sensor range	9.5 mm ± 3 mm	◆	◆
	Light type	Visible green/red/blue, modulated light	◆	◆
	Light source	3 LEDs (R,G,B)	◆	◆
	Light spot representation	rectangular 1 mm x 4 mm	◆	◆
	Angle deviation	max. ± 3°	◆	◆
Vision systems	Jitter	≤ 20 µs	◆	◆
	TEACH-IN	Dynamic TEACH-IN	◆	◆
		static TEACH-IN	◆	◆
	Ambient light limit	5000 Lux	◆	◆
	Approvals	CE	◆	◆
Sensors for hazardous areas	Function display	LED yellow; switching operation: lights up if print mark is detected	◆	◆
		TEACH-IN operation: flashing slowly	◆	◆
		alarm display: flashing quickly, if no safe operation is possible	◆	◆
	Operating elements	TEACH-IN key	◆	◆
	Operating voltage	10 ... 30 V DC	◆	◆
Light grids	Ripple	10 %	◆	◆
	No-load supply current	≤ 75 mA	◆	◆
	Signal output	Push-pull output, short-circuit proof, protected against reverse polarity	◆	◆
	Switching type	Output switches to U _B when print mark is detected and to 0 V when background is detected	◆	◆
		light/dark ON switchable, results from the order of the TEACH-IN	◆	◆
Optical data coupler	Switching voltage	PNP: ≥ (+U _B -2.5 V) , NPN: ≤ 1.5 V	◆	◆
	Switching current	max. 200 mA	◆	◆
	Switching frequency	16.5 kHz	◆	◆
	Response time	30 µs	◆	◆
	Timer function	galvanical time element Off-delay 50 ms	◆	◆
Distance measurement	Function input	TEACH-IN input	◆	◆
	Standards	EN 60947-5-2	◆	◆
	Ambient temperature	-20 ... 60 °C (253 ... 333 K)	◆	◆
	Storage temperature	-20 ... 75 °C (253 ... 348 K)	◆	◆
	Protection degree	IP67	◆	◆
Accessories	Connection	M12 connector, 5 pin	◆	◆
	Material		◆	◆
	Housing	PC (Makrolon, glass-fibre-reinforced)	◆	◆
	Optical face	glass	◆	◆
	Mass	200 g	◆	◆



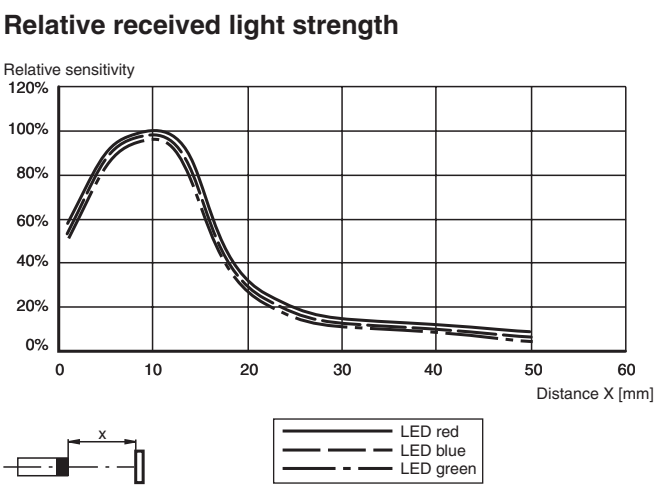
Electrical connection

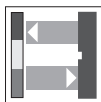
Connection type



plug M12, 5 pin

Diagrams





Print mark contrast scanner

RL-UV3/...



Features

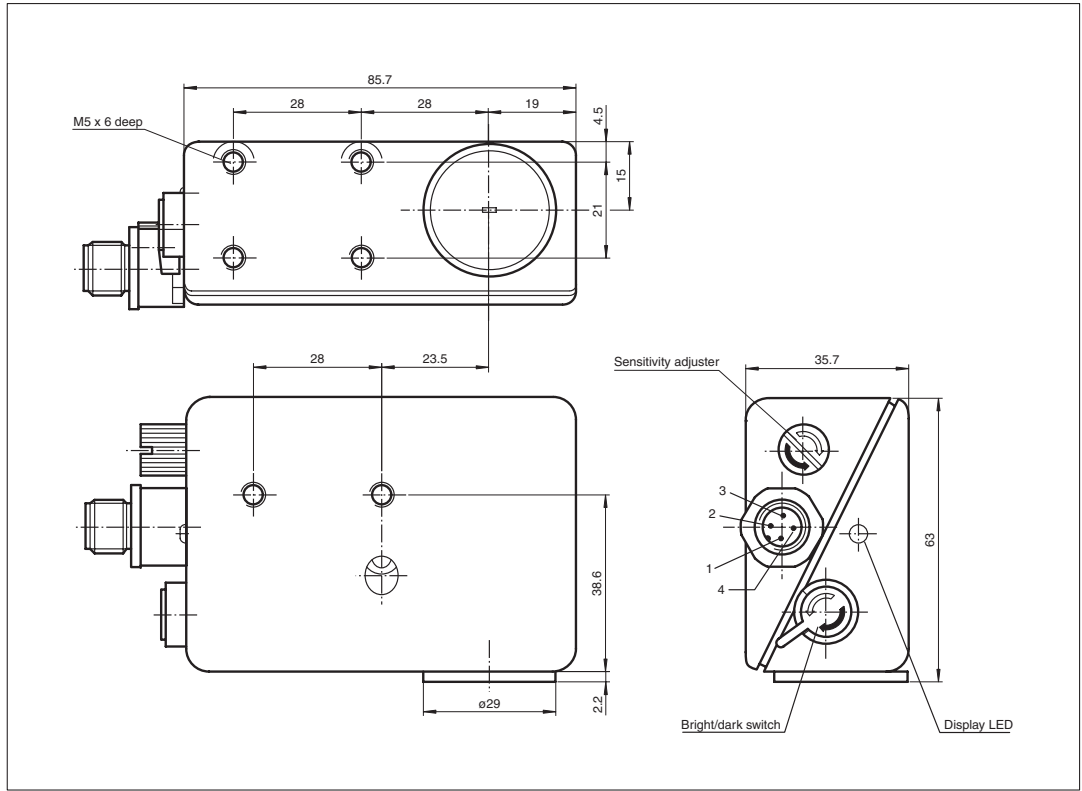
- Diffuse mode sensor for recording fluorescent marks or materials
- UV, emitter light
- Switch output and analogue output
- Emitter deactivation
- Sturdy, waterproof metal housing

For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.

RL-UV3/...

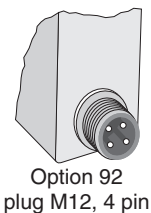
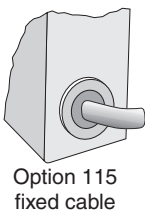
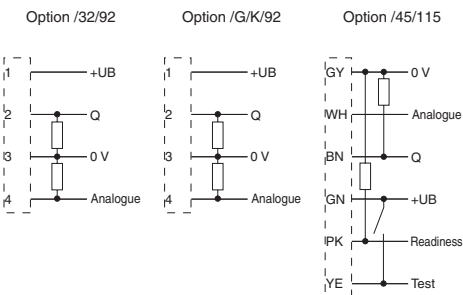
Technical data

		Ordering code:			
		RL-UV3/32/92	RL-UV3/G/K/92	RL-UV3/45/115	RL-UV3/H/9s/32/92
Contrast sensors, Color sensors	Detection range	0 ... 130 mm	◆	◆	◆
		0 ... 80 mm			◆
	Light type	UV, modulated light	◆	◆	◆
	Light source	LED	◆	◆	◆
Vision systems	Light spot representation	17 mm at 20 mm sensor range	◆	◆	◆
	Approvals	CE	◆	◆	◆
	Function display	LED green, lights up with receiver lit	◆	◆	◆
	Operating elements	Sensitivity adjuster, light/dark switch	◆	◆	◆
Sensors for hazardous areas	Operating voltage	22 ... 26 V DC	◆	◆	◆
	Ripple	5 %	◆	◆	◆
	No-load supply current	200 mA	◆	◆	◆
	Signal output	1 npn			◆
Light grids		1 npn, short-circuit proof		◆	
		1 pnp, short-circuit proof	◆		◆
	Switching type	light/dark switching	◆	◆	◆
	Switching voltage	max. 30 V DC	◆	◆	◆
Optical data coupler	Switching current	200 mA	◆	◆	◆
		30 mA		◆	
	Switching frequency	90 Hz	◆	◆	◆
	Response time	100 µs	◆	◆	◆
Distance measurement	Timer function	Impulsed off-delay IAB, 70 ms			◆
	Measurement output	Analogue output 0.5 ... 8 V DC	◆	◆	◆
	Test input	emitter deactivation: modulation is switched off, lamp continues to light up			◆
	Standards	EN 60947-5-2	◆	◆	◆
Accessories	Ambient temperature	-20 ... 50 °C (253 ... 323 K)	◆	◆	◆
	Storage temperature	-20 ... 75 °C (253 ... 348 K)	◆	◆	◆
	Protection degree	IP67	◆	◆	◆
	Connection	M12 connector, 4-pin	◆	◆	◆
Miniature sensors		2 m fixed cable		◆	
	Material				
	Housing	aluminium pressure moulding	◆	◆	◆
	Optical face	glass	◆	◆	◆
Rectangular housing	Mass	290 g	◆	◆	◆
Cylindrical housing					
Fibre optic devices					



Electrical connection

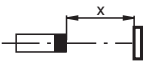
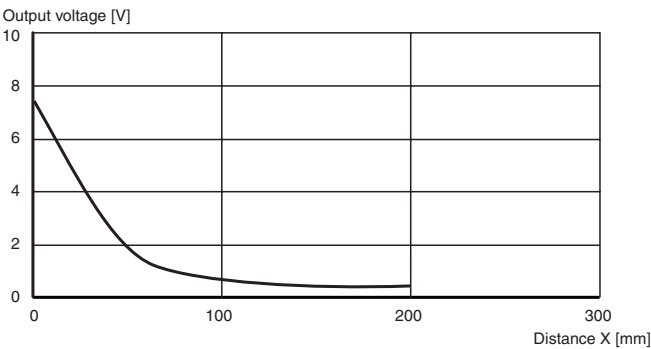
Connection type



Diagrams

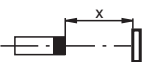
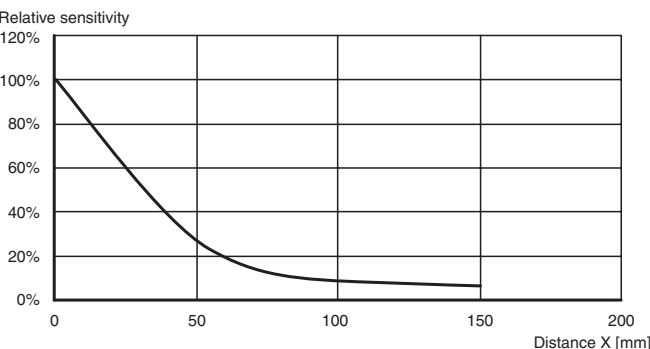
Analogue output

RL-UV3



Relative received light strength

RL-UV3



Miniature sensors
Rectangular housing
Cylindrical housing
Fibre optic devices
Fork type sensors
Contrast sensors, Color sensors
Vision systems
Sensors for hazardous areas
Light grids
Optical data coupler
Distance measurement
Accessories



Print mark contrast scanner

RL-UV4/32/92



Features

- Diffuse mode sensor for recording fluorescent marks or materials
- UV, emitter light
- Switch output and analogue output
- Emitter deactivation
- Sturdy, waterproof metal housing

For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.

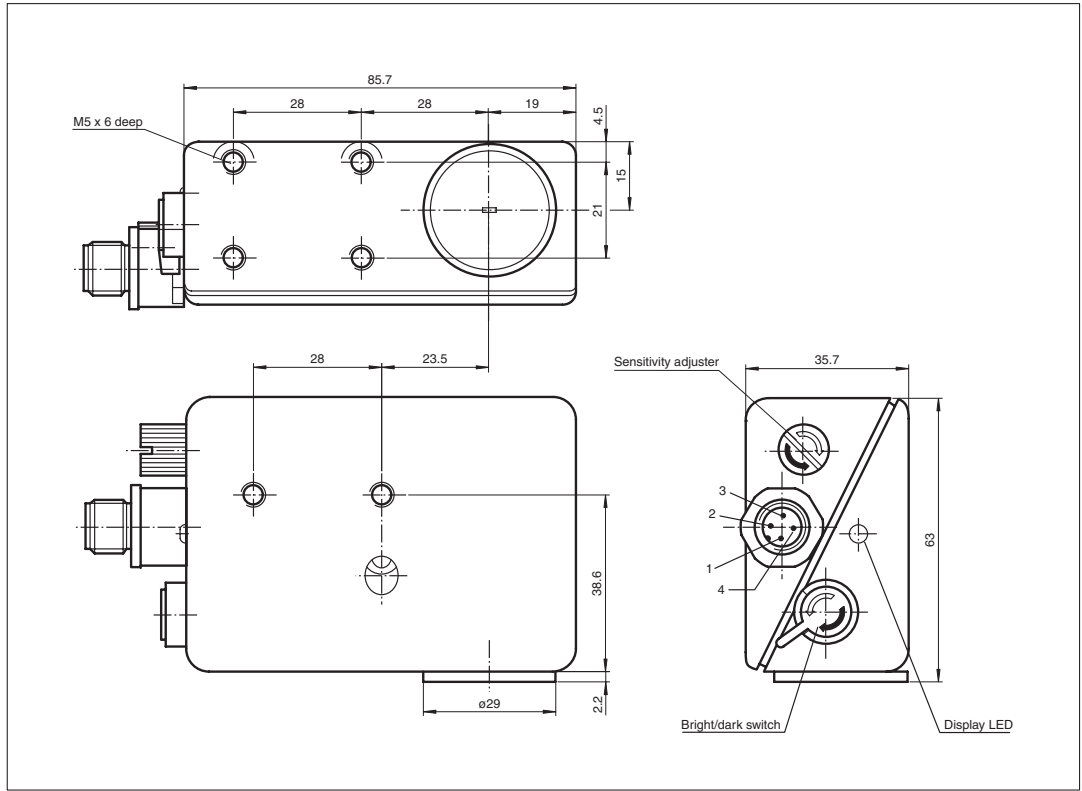
RL-UV4/32/92

Technical data

Ordering code:

RL-UV4/32/92

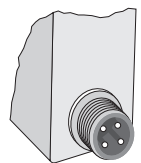
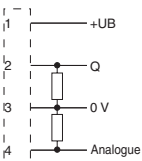
Detection range	28 mm +/- 3 mm	◆
Light type	UV, modulated light	◆
Light source	LED	◆
Light spot representation	17 mm at 20 mm sensor range	◆
Approvals	CE	◆
Function display	LED green, lights up with receiver lit	◆
Operating elements	Sensitivity adjuster, light/dark switch	◆
Operating voltage	22 ... 26 V DC	◆
Ripple	5 %	◆
No-load supply current	200 mA	◆
Signal output	1 pnp, short-circuit proof	◆
Switching type	light/dark switching	◆
Switching voltage	max. 30 V DC	◆
Switching current	200 mA	◆
Switching frequency	90 Hz	◆
Response time	0.7 ms	◆
Measurement output	Analogue output 0.5 ... 8 V DC	◆
Standards	EN 60947-5-2	◆
Ambient temperature	-20 ... 50 °C (253 ... 323 K)	◆
Storage temperature	-20 ... 75 °C (253 ... 348 K)	◆
Protection degree	IP67	◆
Connection	M12 connector, 4-pin	◆
Material		◆
Housing	aluminium pressure moulding	◆
Optical face	glass	◆
Mass	290 g	◆



Electrical connection

Connection type

Option /32/92

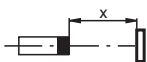
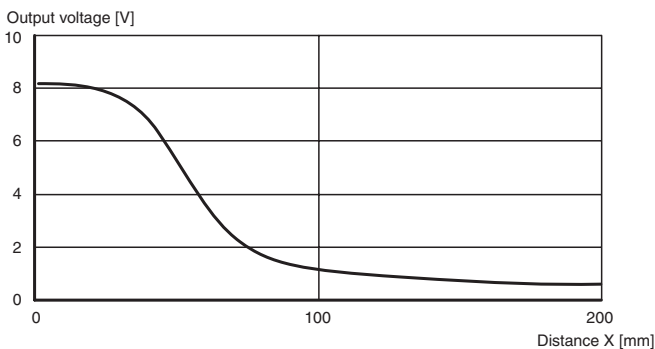


Option 92
plug M12, 4 pin

Diagrams

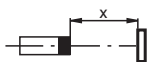
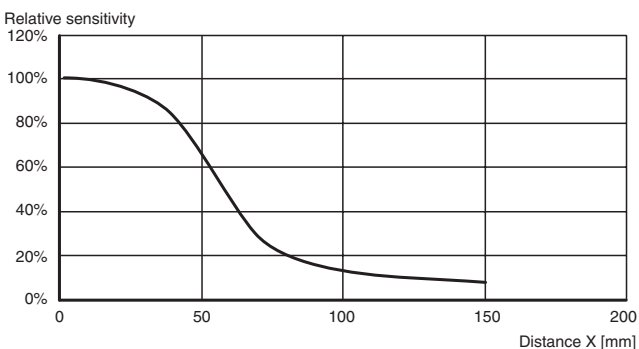
Analogue output

RL-UV4



Relative received light strength

RL-UV4





Print mark colour scanner

DF12-11-3K/.../145/151



Features

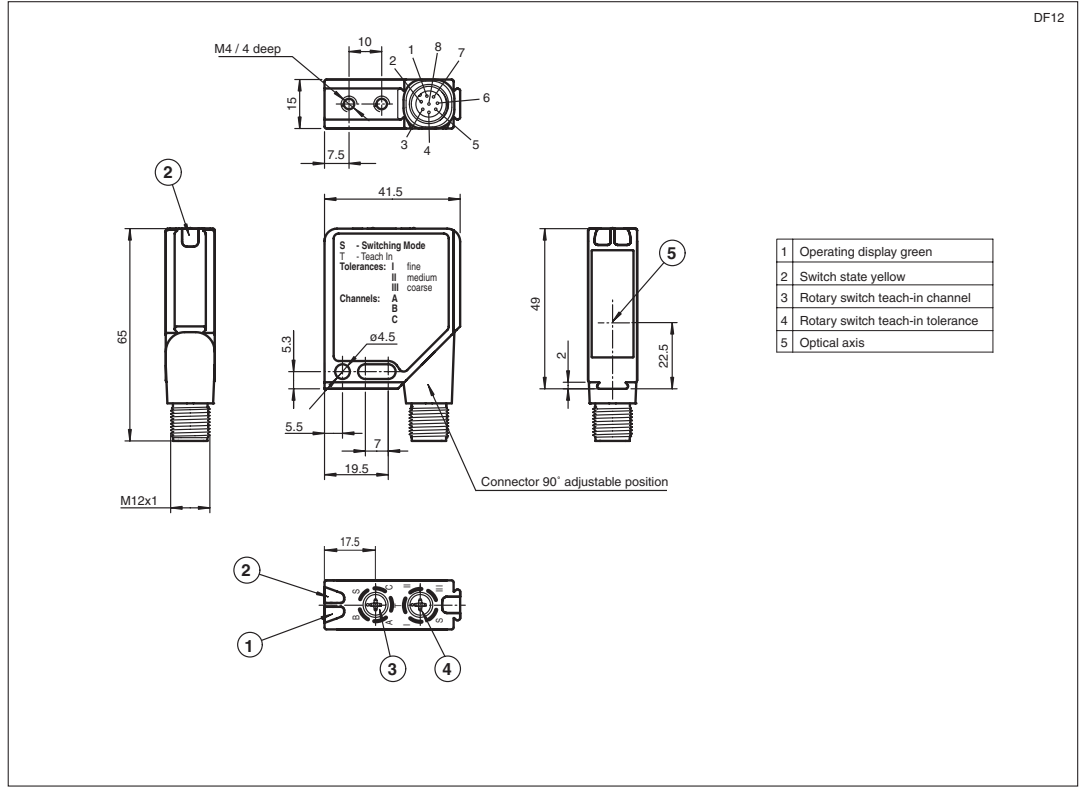
- Diffuse mode sensor for recording coloured print marks on backgrounds with different colours
- Colour detection by means of the active three-range method
- TEACH-IN procedure for automatic threshold value setting
- 3 independent channels
- 3 tolerance steps per channel
- 3 Push-pull outputs

For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.

DF12-11-3K/.../145/151

Technical data

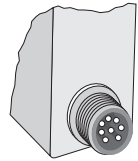
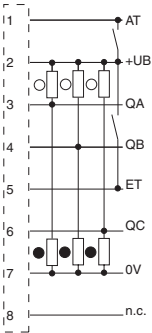
Ordering code:		DF12-11-3K/145/151	DF12-11-3K/9s20/145/151
Sensor range	11 mm ± 2 mm	◆	◆
Light type	Visible green/red/blue, modulated light	◆	◆
Light source	3 LEDs (R,G,B)	◆	◆
Light spot representation	1 mm x 3 mm	◆	◆
Angle deviation	max. ± 3°	◆	◆
Approvals	CE, cULus	◆	◆
Operating display	Green LED, statically lit Power on , Undervoltage indicator: Green LED, pulsing (approx. 0.8 Hz) , short-circuit : LED green flashing (approx. 4 Hz)	◆	◆
Function display	2 LEDs yellow, light up in case of detection	◆	◆
Operating elements	2 TEACH-IN rotary switch for TEACH-IN channel and TEACH-IN tolerance .	◆	◆
TEACH-IN indication	TEACH-IN channel: LED green/yellow equiphase flashing; 2,5 Hz . TEACH-IN tolerance: LED green/yellow non equiphase flashing; 2,5 Hz .	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 40 mA	◆	◆
Protection class	II, rated voltage ≤ 250 V AC with degree of pollution 1-2 according to IEC 60664-1	◆	◆
Signal output	3 Push-pull outputs, short-circuit proof, reverse polarity protection	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	500 Hz	◆	◆
Response time	1 ms	◆	◆
Timer function	Impulsed time element off-delay 20 ms		◆
Function input	Ext. Teach-In input (ET) Ext. blanking-input (AT)	◆	◆
Standards	EN 60947-5-2	◆	◆
Ambient temperature	-20 ... 60 °C (253 ... 333 K)	◆	◆
Storage temperature	-20 ... 75 °C (253 ... 348 K)	◆	◆
Protection degree	IP67	◆	◆
Connection	Metal connector M12, 8-pin, 90° convertible	◆	◆
Material			
Housing	Frame: die-cast zinc, nickel-plated Laterals: plastic PC, glass-fiber reinforced	◆	◆
Optical face	Plastic pane	◆	◆
Mass	60 g	◆	◆



Electrical connection

Connection type

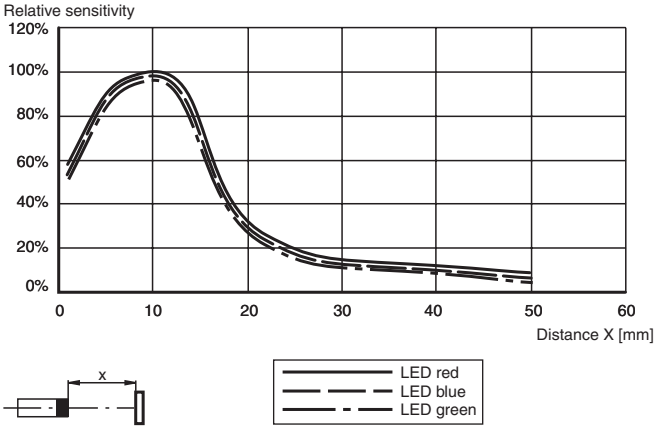
Option /145/151

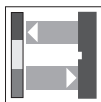


Option 151
plug M12, 8 pin

Diagrams

Relative received light strength





Features

- Diffuse mode sensor for recording coloured print marks on backgrounds with different colours
- TEACH-IN procedure for automatic threshold value setting
- 3 emitter colours: green, red and blue
- Very short response time
- Optical system exchangeable by 90°
- Sturdy, waterproof plastic housing
- Impulsed time element off-delay
DF20/9S20/49/124

For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.

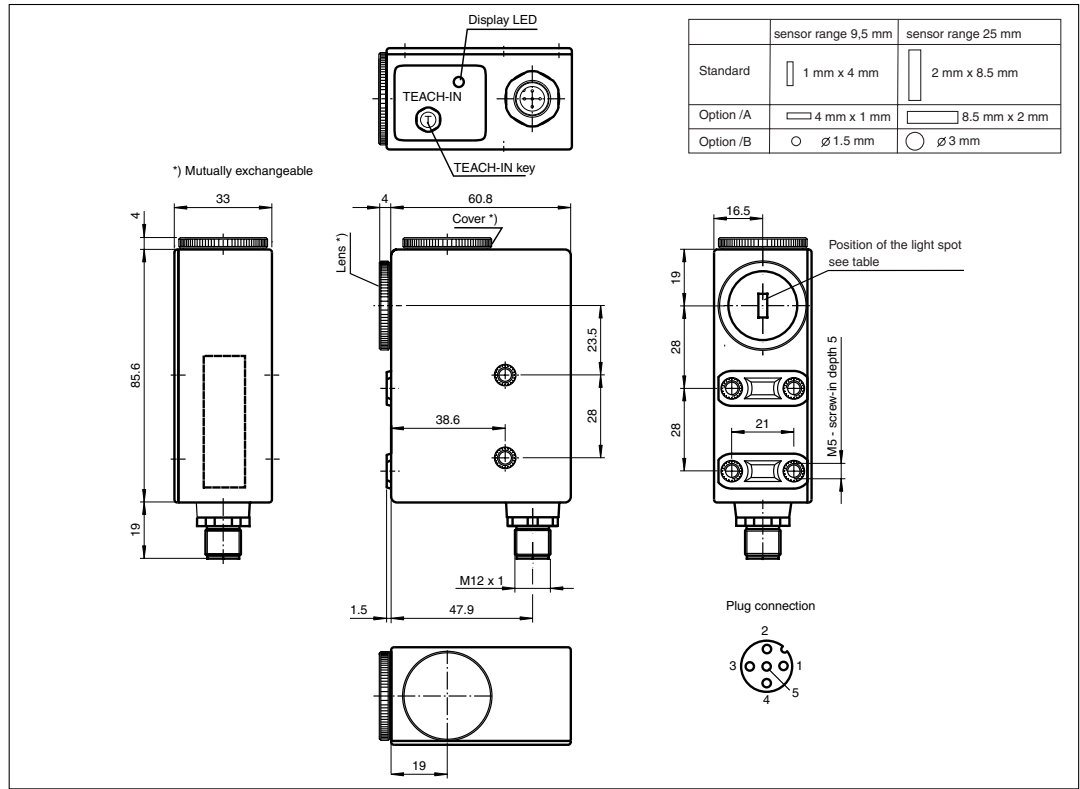
DF20/9.20/49/124

Technical data

Ordering code:

	DF20/35A/49/124	DF20/49/124	DF20/9S20/49/124	DF20/B/49/124
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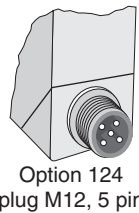
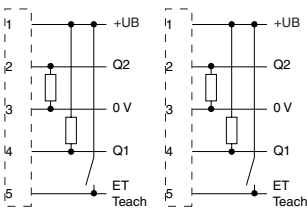
Contrast sensors, Color sensors	Sensor range	25 mm ± 4 mm	◆			
		9.5 mm ± 2 mm		◆	◆	◆
	Light type	Visible green/red/blue, modulated light	◆	◆	◆	◆
	Light source	3 LEDs (R,G,B)	◆	◆	◆	◆
Vision systems	Light spot representation	Light spot, point-shaped, diameter 1.5 mm				◆
		rectangular 1 mm x 4 mm		◆	◆	
		rectangular 2 mm x 8.5 mm	◆			
	Angle deviation	max. ± 3°	◆	◆	◆	◆
Sensors for hazardous areas	Approvals	CE	◆	◆	◆	◆
	Function display	LED yellow, lights up if print mark is detected flashes, if no safe operation is possible	◆	◆	◆	◆
	Operating elements	TEACH-IN key	◆	◆	◆	◆
	Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Light grids	Ripple	10 %	◆	◆	◆	◆
	No-load supply current	≤ 55 mA	◆	◆	◆	◆
	Signal output	1 pnp and 1 npn short-circuit proof, open collector, synchronized-switching	◆	◆	◆	◆
	Switching type	pnp switches according to +U _B , npn according to 0 V for detected mark	◆	◆	◆	◆
Optical data coupler	Switching voltage	PNP: ≥ (+U _B -2.5 V) , NPN: ≤ 1.5 V	◆	◆	◆	◆
	Switching current	max. 200 mA	◆	◆	◆	◆
	Switching frequency	1.65 kHz	◆	◆	◆	◆
	Response time	300 μs	◆	◆	◆	◆
Distance measurement	Timer function	Impulsed time element off-delay 20 ms				◆
	Function input	TEACH-IN input	◆	◆	◆	◆
	Standards	EN 60947-5-2	◆	◆	◆	◆
	Ambient temperature	-20 ... 60 °C (253 ... 333 K)	◆	◆	◆	◆
Accessories	Storage temperature	-20 ... 75 °C (253 ... 348 K)	◆	◆	◆	◆
	Protection degree	IP67	◆	◆	◆	◆
	Connection	connector M12 x 1, 5-pin	◆	◆	◆	◆
	Material					
Accessories	Housing	PC (Makrolon, glass-fibre-reinforced)	◆	◆	◆	◆
	Optical face	glass	◆	◆	◆	◆
	Mass	200 g	◆	◆	◆	◆



Electrical connection

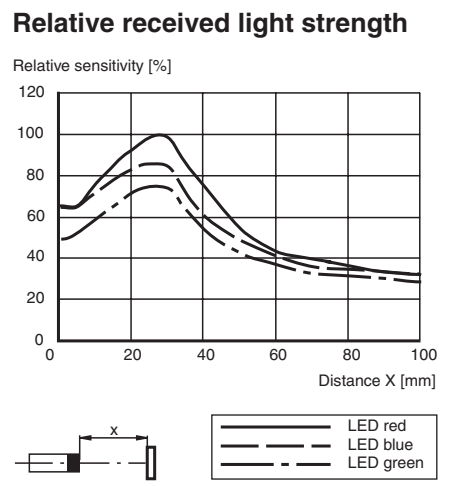
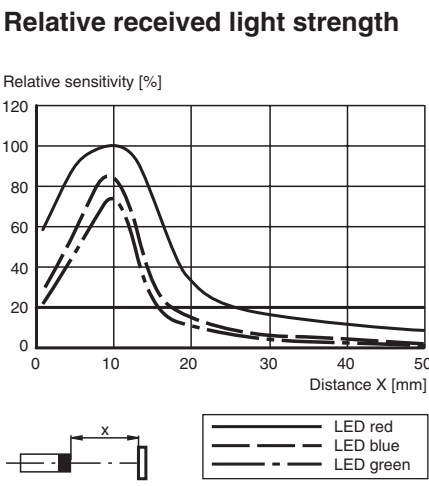
Connection type

Option 35a/49/124 Option 49/124



Option 124
plug M12, 5 pin

Diagrams





Features

- Diffuse mode sensor for recording coloured print marks on backgrounds with different colours
- TEACH-IN procedure for automatic threshold value setting
- 3 emitter colours: green, red and blue
- Very short response time
- Optical system exchangeable by 90°
- Stainless steel version, especially suitable for applications in the food industry

For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.

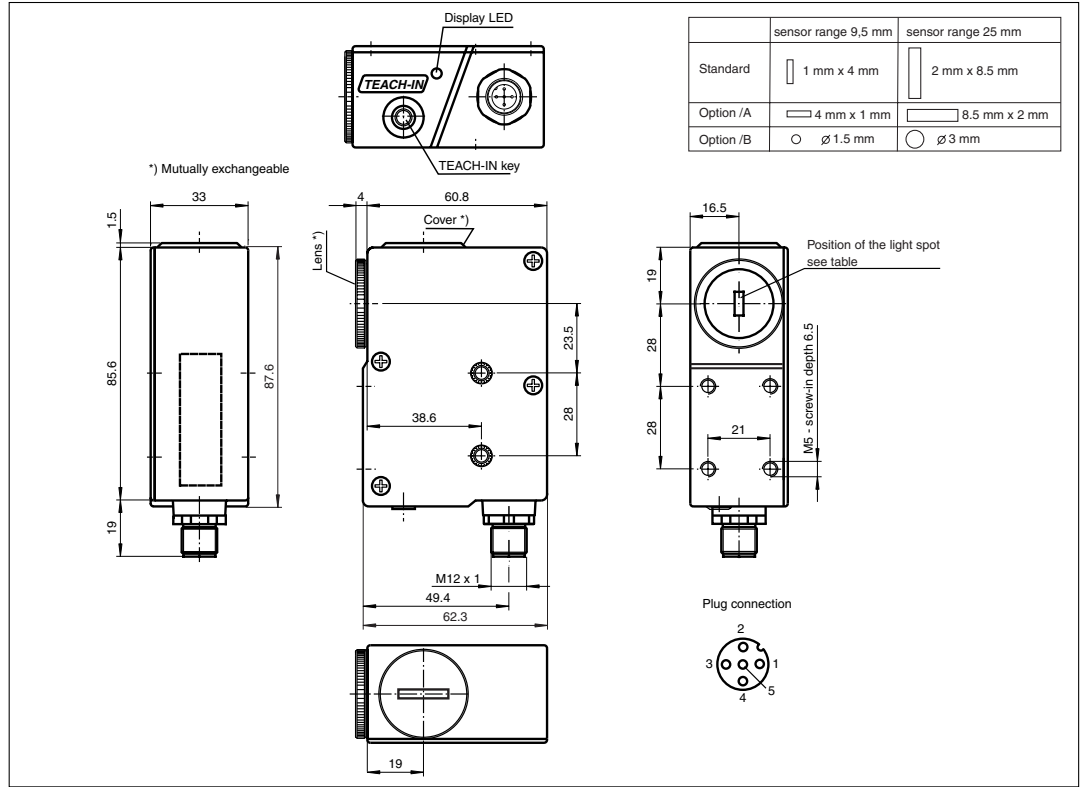
DFE20/49/124

Technical data

Ordering code:

DFE20/49/124

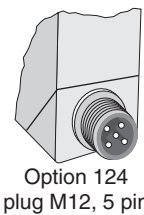
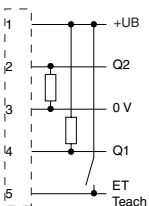
Sensor range	9.5 mm ± 2 mm	◆
Light type	Visible green/red/blue, modulated light	◆
Light source	3 LEDs (R,G,B)	◆
Light spot representation	rectangular 1 mm x 4 mm ,	◆
Angle deviation	max. ± 3°	◆
Approvals	CE	◆
Function display	LED yellow, lights up if print mark is detected flashes, if no safe operation is possible	◆
Operating elements	TEACH-IN key	◆
Operating voltage	10 ... 30 V DC	◆
Ripple	10 %	◆
No-load supply current	≤ 55 mA	◆
Signal output	1 pnp and 1 npn short-circuit proof, open collector, synchronized-switching	◆
Switching type	pnp switches according to +U _B , npn according to 0 V for detected mark	◆
Switching voltage	PNP: ≥ (+U _B -2.5 V) , NPN: ≤ 1.5 V	◆
Switching current	max. 200 mA	◆
Switching frequency	1.65 kHz	◆
Response time	300 µs	◆
Function input	TEACH-IN input	◆
Standards	EN 60947-5-2	◆
Ambient temperature	-20 ... 60 °C (253 ... 333 K)	◆
Storage temperature	-20 ... 75 °C (253 ... 348 K)	◆
Protection degree	IP67	◆
Connection	Metal connector M12 x 1, 5-pin	◆
Material		
Housing	Stainless steel	◆
Optical face	glass	◆
Mass	530 g	◆



Electrical connection

Connection type

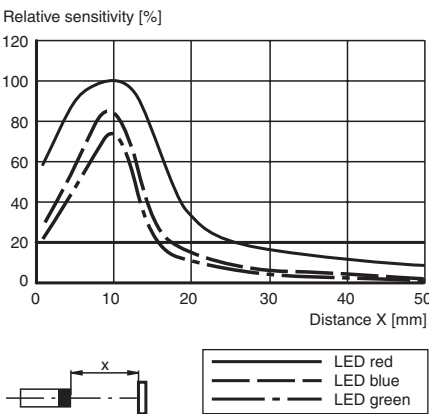
Option 49/124



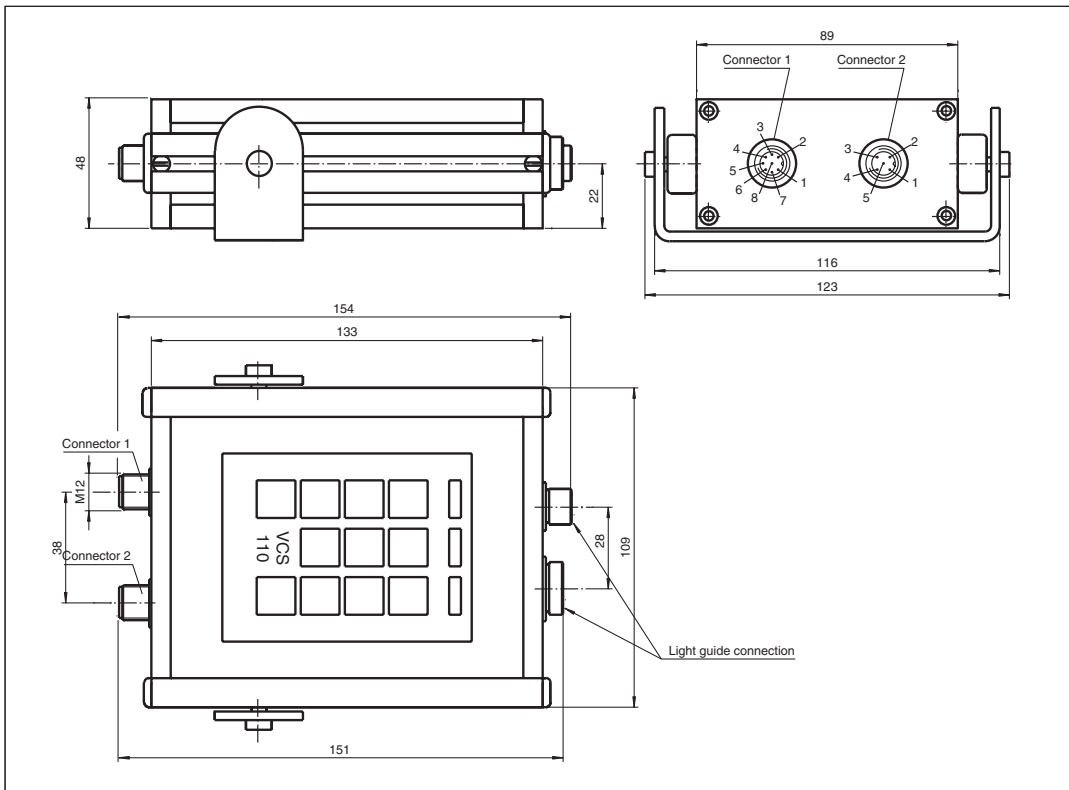
Option 124
plug M12, 5 pin

Diagrams

Relative received light strength



Miniature sensors			Colour sensor		VCS110-...	
Rectangular housing			 		Features	
• Colour saving by TEACH-IN key • Programmable up to 10 channels • Colour tolerances memorisable • Light source white-light LED • Signal outputs direct or binary coded • For glass fibre optics or for plastic fibre optics						
Cylindrical housing						
Fibre optic devices						
For suitable cable sockets, reflectors, mounting aids and more, please refer to chapter „Accessories“.						
VCS110-...						
Fork type sensors	Technical data					Ordering code:
Contrast sensors, Color sensors	Sensor range	max. 100 mm				VCS110-10K
	Light type	White light, modulated light				VCS110-5K
	Light source	LED				
	Light spot representation	approx. 5 mm ... 60 mm (depends on sensor range and fibre optics)				
	Approvals	CE, UL				
Vision systems	Operating display	LED for power on				
	Function display	one yellow LED each per colour channel lights up if colour detected, three LEDs as adjustment accessories				
	Operating elements	membrane keys				
	Operating voltage	18 ... 30 V DC				
	Ripple	10 %				
Sensors for hazardous areas	No-load supply current	max. 100 mA				
	Signal output	4 pnp, short-circuit proof, binary coded, assigned to the value memory slots 5 pnp, short-circuit proof, each with two assigned value memory slots The last activated channel is exported.				
	Switching type	according to +U _B switching, if colour detected				
	Switching voltage	max. 30 V DC				
	Switching current	max. 200 mA per output				
Light grids	Switching frequency	40 Hz				
	Response time	4 ms				
	De-energized delay	20 ms				
	Output of the pre-fault indication	pnp, active in TEACH-IN mode or if all value memory slots are empty				
	Function input	Trigger, keyboard disable				
Optical data coupler	Standards	EN 60947-5-2				
	Ambient temperature	-10 ... 50 °C (263 ... 323 K)				
	Storage temperature	-20 ... 75 °C (253 ... 348 K)				
	Protection degree	IP65				
	Connection	M12 connector, 8-pin and M12 connector, 5 pin				
Distance measurement	Material					
	Housing	aluminium				
	Optical face	Fibre optics				
	Mass	300 g				
	Accessories					

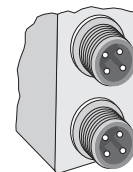
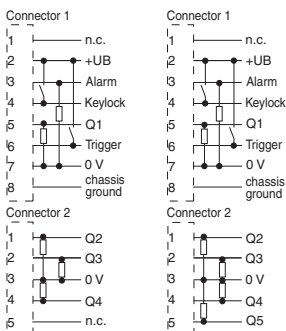


Electrical connection

Connection type

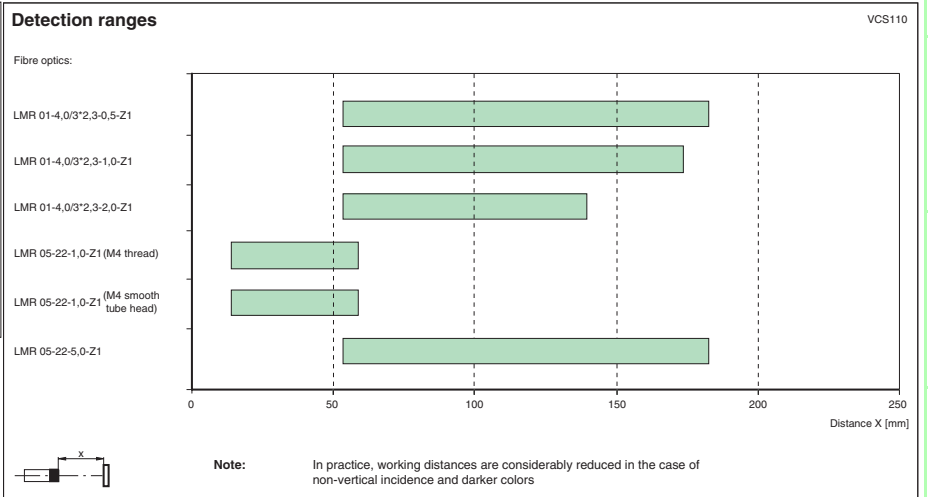
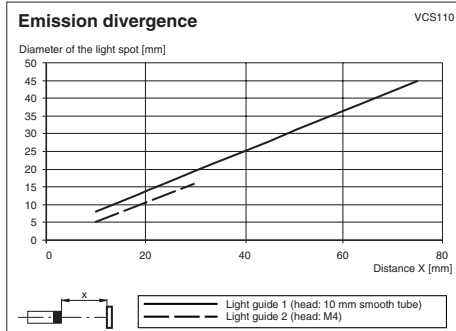
Option -10K

Option -5K



connectors M12

Diagrams



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